N50092.AR.000146
JEB FORT STORY, VA
5090.3a

DRAFT WORK PLAN - REVISION 1 - 80TH DIVISION REMOVAL ACTION FORT STORY VA
3/20/1995
INTERNATIONAL TECHNOLOGICAL CORPORATION

0146

INTERNATIONAL TECHNOLOGY CORPORATION

Project No. 519201
February 1995

Work Plan

80th Division Removal Action
Ft. Story, Virginia

Contract No. DACW45-94-D-0054
Delivery Order Number 0003

Prepared for:
Department of the Army
Omaha District, Corps of Engineers
Omaha, Nebraska

Prepared by:
IT Corporation
Monroeville, Pennsylvania

RESPONSIVE TO THE NEEDS OF ENVIRONMENTAL MANAGEMENT

DRAFT WORK PLAN
80TH DIVISION REMOVAL ACTION
FORT STORY, VIRGINIA

Contract No. DACW45-94-D-0054
Delivery Order No. 0014

Prepared by:

IT CORPORATION
2790 Mosside Boulevard
Monroeville, Pennsylvania 15146-2792

Prepared for:

U. S. Army Corps of Engineers
Omaha District
215 North 17th Street
Omaha, Nebraska 68102-4978

Rev. 1, March 20, 1995

TABLE OF CONTENTS

1.0 Introduction 1

2.0 Scope of Work 1
- 2.1 Site Visit 1
- 2.2 Advance Sampling 2
- 2.3 Plan Preparation 2
- 2.4 Mobilization/Demobilization 2

3.0 Remediation of LARC Area 2
- 3.1 Site Preparation 2
- 3.2 Excavation/Screening/Stockpiling 3
- 3.3 Thermal Remediation 3
- 3.4 Sampling and Analytical Testing 3
- 3.5 Backfill 3

4.0 Site Teardown 4

5.0 Submittals/Reporting/Project Controls 4
- 5.1 Daily Report 4
- 5.2 Project Meetings 4
- 5.3 Weekly Reporting 4
- 5.4 Final Report 5
- 5.5 Site Controls 7
- 5.6 Contractors Quality Control Program 8

6.0 Project Management and Staff 21
- 6.1 Project Overview 21
- 6.2 Project Organization 21
- 6.3 Project Personnel 22

Figures

Appendix A Contractor Sampling and Analysis Plan (CSAP)

Appendix B Site Safety and Health Plan (SSHP)

Appendix C Analytical Results (Delivery Order No. 0003)

1.0 Introduction

The following Work Plan (WP) has been prepared by IT Corporation (IT) for the U. S. Army Corps of Engineers (USACE), Omaha District, in compliance with Rapid Response Contract DACW45-94-D-0054, Delivery Order No. 0014, and based upon USACE's Scope of Work dated March 14, 1995.

The Plan addresses the excavation, loadout, off-site thermal remediation and backfill of approximately 4,500 tons of total petroleum hydrocarbon (TPH) contaminated soil from areas adjacent to the 80th Division amphibious landing craft (LARC) washing and maintenance area. Additional tasks include analytical sampling of bottom and sides of the excavation.

2.0 Scope of Work

The overall Scope of Work for this project is to remove, thermally remediate and backfill approximately 4,500 tons of TPH contaminated soil.

The following activities will be required based upon the Scope of Work as outlined by the USACE and discussions during the January 25, 1995 site visit:

- Site Visit
- Plan Preparation
- Mobilization/Demobilization
- Site Preparation
- Excavation/Analytical
- Subcontractor (Off-Site Thermal Remediation)
- Backfill
- Site Teardown
- Project Support/Site Indirects
- Project Closeout/Final Report

2.1 Site Visit

On January 25, 1995, representatives of the USACE Omaha District and IT met at Ft. Story, Virginia to walk the project site and discuss the rapid response action to be performed.

2.2 Advance Sampling

Advance sampling was accomplished under Delivery Order No. 0003 (DO#3). Analytical results are attached as Appendix C.

2.3 Plan Preparation

The efforts incorporated in the various plan preparations are in response to the preliminary order notice, site visit, various discussions with USACE and IT technical personnel for DO#3. This DO#3 was a fixed price order based on a transportation and disposal type disposal action. Since plans for DO#3 were drafted, a determination to establish a new DO was made based on an on-site thermal remediation type action. The changed method of remediation caused revision in required plans. The basic WP, including the basic CSAP and SSHSP, were accomplished under DO#3. Costs for the above revisions exceed the funds available for DO#3. USACE personnel changes and further project reviews resulted in a change to off-site thermal remediation, thus necessitating further revision to this Work Plan.

All three plans will be submitted as sections within this Work Plan. All plans will be reviewed and approved by the USACE prior to the start of on-site field activities. Revisions and resubmittals will be made as necessary.

2.4 Mobilization/Demobilization

The project field crew, along with most small tools/equipment, will be mobilized from IT's regional office located in Monroeville, Pennsylvania. It is estimated to be 450 miles from Monroeville to the job site. The time allotted for mobilization/demobilization of the crew is one ten hour day. Other equipment and materials such as trailer, generator, portable lights, treatment chemicals and filter media will be obtained locally when possible. This should allow for minimal transport charges.

3.0 Remediation of LARC Area

3.1 Site Preparation

IT will have required digging clearances prior to actual mobilization. During the two (2) days planned for site preparation, IT will set up an office trailer for USACE and field use and storage of tools and equipment. IT will perform the following additional actions during this phase:

- Coordinate with local authorities
- Mobilize heavy equipment and begin excavation, if possible
- Remove fencing, as necessary
- Clear debris from work area
- Establish work site perimeter

3.2 Excavation/Screening/Stockpiling

IT will begin the excavation process as early as possible.

IT will perform the following activities during this phase:

- Excavate contaminated soil to 3' depth
- Take samples per CSAP on bottom grid and sidewalls. If samples are negative - proceed; if samples are positive, excavate to 4' and proceed. No more samples would be required since 4' is local water table.
- Loadout contaminated soil for transportation to off-site thermal treatment site

3.3 Thermal Remediation

A subcontractor will provide off-site thermal remediation by utilizing a low temperature thermal desorption unit, fully permitted in Virginia and capable of operating at 20 tons per hour. The requirement is to thermally treat off-site, the petroleum contaminated soils to total petroleum hydrocarbon (TPH) levels below 100 parts per million. The subcontractor will transport contaminated soil to the off-site thermal unit and transport clean soil for backfill to Ft. Story. Tons remediated will be determined by the subcontractor's unit internal scale and verified by on-site truck scales.

3.4 Sampling and Analytical Testing

Samples will be taken in two areas. The bottom and sidewalls of the excavation will be sampled on a 20'-25' grid to ensure contamination is all removed. See CSAP at Appendix A.

3.5 Backfill

Clean soil will be stockpiled until analytical results allow backfill. Only certified clean soil will be used to backfill the excavation. Compaction will be provided by rubber tired loader. Excess soil remediated will be worked into the excavated and immediately surrounding areas.

4.0 Site Teardown

Upon notification from the USACE-OSR that the tasks are successfully completed, teardown of the site will begin. Trailers or temporary facilities will be removed and the site will be restored to its preremedial condition. No revegetation or restoration is anticipated to be required on this site. Fencing removed will be restored to its original condition as directed by the OSR.

5.0 Submittals/Reporting/Project Controls

5.1 Daily Report

In order to document the day's field activities, the Contractor will prepare a Rapid Response Quality Control Daily Report for review by the USACE-OSR. This five-page document will discuss weather conditions, work performed by IT and their subcontractors, inspections performed and their results, delays in job progress, verbal instruction/ communications, personnel and equipment on site, transportation and disposal information, safety violations and corrective actions, sampling activities and locations, results of any on-site field screening, and the estimated cost for each day's activity. The Contractor's Operations Supervisor will submit this report prior to the conclusion of each day's activities. A sample copy is included at the end of this chapter.

5.2 Project Meetings

Due to the short duration of this project, it will not be necessary to conduct regularly scheduled progress meetings at the job site. A preconstruction meeting will be conducted by the USACE on the first day of mobilization to the job site. All IT field personnel and the Project Manager will be in attendance. Should additional meetings be required during the course of the project, they will be conducted by conference call. Parties involved for the conference call will be as appropriate to the discussion.

5.3 Weekly Reporting

A project status report will be submitted on a weekly basis beginning with site mobilization through site demobilization. The report shall be the responsibility of the Contractor's Project Manager with input from on-site supervisory personnel. The report will be submitted to the USACE Technical Manager and Fort Crook Project Engineer via Telefax. The report shall be submitted no later than Tuesday 8:00 a.m. of the following week being reported. The report shall include:

- Summary of work completed on site and off site
- Problems encountered with recommended corrective actions
- Deviations from the work plan
- Planned activities for the upcoming week
- Any approved or anticipated changes in scope
- Summary of on-site personnel and changes involving such
- Summary of all disposal activity for the week (if any).

5.4 Final Report

5.4.1 Overview

The final report will present an overview of the field activities from mobilization through demobilization, unique or special tasks performed, additional work performed beyond the original scope of work, problems encountered and associated corrective action, and the Contractor's conclusions and comments with regard to this project.

Draft and final copies of the completion report shall be submitted. The draft final report shall be submitted within four weeks after completion of all field work including disposal. While all submittals should be error free, an extra effort will be made to provide an error-free final completion report. Partial submittals will not be submitted unless previously approved or specifically requested. A cover letter will accompany each document and indicate the project, contract number, delivery order number, and to whom comments are to be submitted. The cover letter will not be bound into the document. The completion report will include (if applicable), but not limited to, the following:

5.4.2 Summary of Work Performed

Summary of work performed including, but not limited to:

- Narrative of the scope of work (including project objectives, mobilization and demobilization, site setup, miscellaneous work tasks, site operations)

- Safety discussion and report of accidents/incidents

- Discussion of the quality assurance (QA)/QC utilized by the Contractor specific to this delivery order

- Any other unique or special tasks performed or situations noted during the removal and

treatment/disposal tasks.

- Photographs of all field work through demobilization and the overall site before and after this Contractor's work
- Summary of the volume of water treated/discharged
- Summary of the volume of sludge disposed
- Summary of final disposition of spent filter media and drummed sludge material
- Results of all analytical testing performed off site
- Conclusions.

5.4.3 Supporting Data

The tabulation of criteria, data, circulations, etc., which are performed but not included in detail in the report shall be assembled as appendices. Criteria information provided by the Omaha District need not be reiterated, although they should be referenced as appropriate. The appendices shall include, but not be limited to:

- The final scope of work
- Completed permits and applicable licenses
- Waste manifests, waste profile sheets, and/or weigh tickets, if necessary
- Daily logs of the plant operation to include volume of water treated, pH of discharged water, chemicals used, downtime, etc.
- Rapid Response QC daily reports
- Sampling and analysis documentation and results (to include discharge water sampling)
- Chain-of-Custody records
- Photo documentation, to include one set of photographs
- List of visitors
- Project points of contact address and telephone (including site manager, transportation and disposal (T&D) contractors, subcontractors' names, USACE-Project Manager, Fort Crook personnel, etc.)

- Completed verbal conversation records, especially ones that either impact the scope of work, cost proposal, and final report

- Certification of disposal at the treatment/storage/disposal facility (TSDF), if hazardous waste.

5.4.4 Covers

The report will be in durable binders which hold pages firmly while allowing easy removal, addition, or deletion of pages. A report title page will identify the report title, the USACE, and the date.

5.4.5 Photographs

Included in the final report will be one copy of all photographs taken prior to starting and throughout the duration of the project. Photographs will be placed in photo albums in a sequential order and labeled.

5.5 Site Controls

5.5.1 Overview

Security measures incorporated at the project site are designed to accomplish the following:

- Protect the public

- Control ingress and egress at the site including personnel, equipment, deliveries, and visitors

- Provide a safeguard against theft and/or destruction of equipment and facilities.

5.5.2 General Security Rules

All employees are subject to the following rules:

- All personnel are required to sign in and out at the trailer once a day.

- Materials, tools, and equipment will not be permitted to leave the site without proper authorization.

- Property damage or loss will be thoroughly investigated and reported in accordance with IT procedures. These incidents shall be entered in a log specifically maintained for security incidents.

5.5.3 Breaches of Security

In the event unauthorized personnel are discovered in the immediate work area, they shall be properly identified, and detained if possible, until the operations supervisor can be notified. A detailed description of the incident shall be entered into the daily and/or security log. An attempt to locate unauthorized personnel shall be conducted and an entry shall be entered in the daily and/or security log noting time, date, actions taken, and any additional pertinent information.

5.5.4 Site Visitors

No visitors will be allowed access without the approval of the USACE-OSR or Contractor's Site Supervisor.

5.6 Contractors Quality Control Program

5.6.1 Overview

Except for isolated tests or other items of work specified to be performed by government or another contractor, the quality of all work will be the responsibility of this Contractor. Sufficient inspections and tests of all items of work, including that of subcontractors, to ensure conformance to applicable work plans with respect to the quality of materials, workmanship, construction and remediation finish, functional performance, and identification will be performed on a continuing basis. The Contractor will furnish qualified personnel, appropriate facilities, instruments, and testing devices necessary for the performance of the QA/QC function. The controls will be adequate to cover all remediation operations, will be keyed to the proposed remediation sequence, and will be correlated by the Contractor's Project Manager. The QA/QC program will include four phases of inspection and tests. The USACE-OSR will be notified at least 24 hours in advance of each such test.

5.6.2 Preparatory Inspections

Preparatory inspections will be performed prior to beginning each feature of work on any on-site construction work. Preparatory inspections for the applicable feature or work will include (1) review of all other contract requirements with the supervisors directly responsible for the performance of the work; (2) check to ensure that provisions have been made to provide required

field control testing; (3) examine the work area to ascertain that all preliminary work has been completed; (4) verify all field dimensions and advise the USACE-OSR of any discrepancies; and (5) perform a physical examination of materials and equipment to ensure that all materials and/or equipment is on hand.

5.6.3 Initial Inspection

Initial inspection will be performed as soon as work begins on a representative portion of the particular feature of work and will include examination of the quality of workmanship as well as a review of control testing for compliance with contract requirements.

5.6.4 Follow-Up Inspections

Follow-up inspections will be performed continuously as any particular feature of work progresses, to ensure compliance with contract requirements, including control testing, until completion of that feature of work.

5.6.5 Safety Inspections

The Contractor will perform daily, weekly, and monthly safety inspections of the job site and the work in progress to ensure compliance with USACE Safety and Health Requirement Manual, the SSHSP, IT corporate policy, and other occupational health and safety (H&S) requirements. Various reporting forms will be used to document these inspections and will include a notation of the safety deficiencies observed and the corrective actions taken. The Contractor will use his designated on-site supervisory staff to perform the required inspections and will supplement the staff with additional personnel as needed.

5.6.6 Reporting

All inspections and test results will be recorded daily. The sample "Quality Control Rapid Daily Report (QCRDR)" form included at the end of this chapter or other approved form will be reproduced and fully executed to show that all inspections and tests shall be submitted to the USACE-OSR on the first workday following the inspection. This report details personnel utilized, inspections completed, and other pertinent information.

5.6.7 Records

The Contractor will maintain current records of QA/QC operations, activities, and tests performed including the work of suppliers and subcontractors. These records will be included in the Rapid Response Daily Report Form and will indicate a description of trades working on the project; the

number of personnel working; the weather conditions encountered; any delays encountered; and acknowledgement of deficiencies noted, along with the corrective actions taken on current and previous deficiencies. These records will include factual evidence that required activities or tests have been performed, including, but not limited to, the following:

- Type, number, and results of control activities and tests involved
- Nature of defects and causes of rejection
- Proposed remedial action
- Corrective actions taken.

These records will cover both conforming and defective or deficient features and will include a statement that supplies and materials incorporated in the work comply with the contract. These records will be furnished to the USACE-OSR daily.

5.6.8 Enforcement

The Contractor will stop work on any task or subcontractor's task, pending satisfactory correction of any deficiency noted by his QA/QC staff or by the USACE-OSR.

Rapid Response Quality Control Daily Report

IT Corporation

DACW45-94-D-0045; D. O. No. 14

80th Division LARC, Ft. Story, Virginia

Report No. ___ Delivery Order No. 14 Date _____
Weather _____ Rainfall _____ Inches Temp: Min. _____ Max._____

Instructions: The contractor shall submit this form daily at the close of business to the on-site corps representative. Concurrently, the contractor shall provide electronic access to the completed forms to the corps district office and the area office.

1. Work performed today by primary contractor on site and/or off site (including a complete description):_____

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

2. Work performed by subcontractors on site and/or off site (include a complete description):

3. Complete and attach the daily personnel cost report at the end of this document and label as Appendix 1.

N/A

4. On-site conditions which resulted in delayed progress:

5. Type and results on inspections: (indicate whether: P-Preparatory, I-Initial, or F-Follow-up, and include satisfactory work completed or deficiencies with action to be taken):

6. List type and location of tests performed and results:

7. List verbal instructions received from government personnel on any deficiencies or retesting required:

8. Complete and attach the daily equipment cost report at the end of this document and label as Appendix 2.

N/A

9. List the total number of samples collected and tested for the day:
Collected: _____ Tested: _____ Amplifying Info.: _____

_____
_____
_____
_____
_____

10. List the total quantity of wastewater treated: _____ gallon(s)

11. List the total number of drums overpacked:

N/A

12. List the total amount of waste(s) removed from the site:

Liquid: _____BBL/GAL Solids: _____YDS/TONS

Amplifying info: _____

_____
_____

13. List the following transportation and/or disposal information:

Quantity	I.D. No.	Material	Manifest No.	Disposal Location

14. Complete and attach the daily material cost report at the end of this document and label as Appendix 3.

N/A

15. List all safety and violations observed and corrective actions: _____

_____
_____
_____
_____
_____
_____

16. List any credits and/or adjustments due to the government (reference invoice number, conversations, etc.): _____

_____
_____
_____
_____
_____

17. Complete and attach the rapid response daily work order at the end of this document and label as Appendix 4.

N/A

18. Additional comments/remarks:_____

_____

_____

_____

_____

_____

_____

19. Certification: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the primary contractor and each subcontractor and have determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications, except as noted above.

_____

Contractors Designated
Quality Control Representative

Rapid Response
Weekly Report

Project Name 80th Division LARC

For Week Ending ___/___/____

Project Location Ft. Story, VA

Report No. _____

Name Frank Haseltine

Title Project Manager

Company Name and Address IT Corporation, 2790 Mosside Blvd., Monroeville, PA 15146

Telephone No. (412) 372-7701

Telefax No. (412) 858-3340

Reporting Period: ____/____/____ to ____/____/____

Percent Field Work Completed ____%

Percent Project Completed _____%

Summary of work completed on site:

Summary of work completed off site:

Rapid Response Weekly Report

Project Name 80th Division LARC

For Week Ending ___/___/____

Project Location Ft. Story, VA

Report No. _____

Explanation of Deviation from Work Plan (including modifications and schedule slippages):

Problems encountered:

Recommendations:

Rapid Response Weekly Report

Project Name 80th Division LARC

For Week Ending ___/___/____

Project Location Ft. Story, VA

Report No. _____

Work anticipated to be performed the following week:

Unit Price Quantities Reached to date:

Unit Priced Item	Unit	Quantity to Date	Quantity Anticipated

Other remarks:

Signature:

INTERNATIONAL TECHNOLOGY CORPORATION

Date _____

Ft. Story/80th Division LARC
DACW45-94-D-0054
Delivery Order No. 14

EMPLOYEE AND VISITORS SIGN IN/OUT LOG

Company	Employee Name	Employee Signature	TIME			
			In	Out	In	Out

6.0 Project Management and Staff

Project management is generally defined as the planning, control, and direction exercised to ensure that a project conforms to IT's contracted scope and specifications and that the project plans and scope are amended in a timely manner to reflect changes in circumstances. The goals of project management are to produce quality work which meets all contract requirements and to complete projects within budget and schedule to the USACE's satisfaction.

IT's project management system (PMS) is designed to provide its managers with the informational system and control necessary to accomplish all elements of project management in accordance with the project requirements. Project planning, cost control, and execution are the three main components of project management.

6.1 Project Overview

The Contractor will be responsible for ensuring that sufficient supervision, equipment, labor and materials, including H&S and QC provisions, are supplied to execute all the work activities associated with the excavation, thermal remediation and backfill of the contaminated soil at the 80th Division LARC Area, Ft. Story, Virginia.

6.2 Project Organization

The project organization provides a management and technical staff to support the thermal remediation of the contaminated soil. The Contractor will provide:

- Personnel trained in hazardous waste work and experienced in excavation/backfill and thermal remediation activities
- Management of labor, equipment, and material to control, quality, schedule, and cost
- Responsible site management familiar with wage requirements and reporting
- An independent QA/QC site program which will ensure technical and scientific accuracy in all sampling activities
- Experienced sampling personnel to collect and ship the required samples along with executing the proper paperwork
- The development, coordination, and implementation of the site H&S program.

6.3 Project Personnel

The Project Director for this delivery order will be Mr. Albert Meyers, who will ensure that contractual obligations are met. Mr. Douglas Wehner will serve as General Superintendent for this project, ensuring that all reporting, scheduling and budgetary obligations are met. Mr. Meyers and Mr. Wehner are located at IT's regional office in Cincinnati, Ohio.

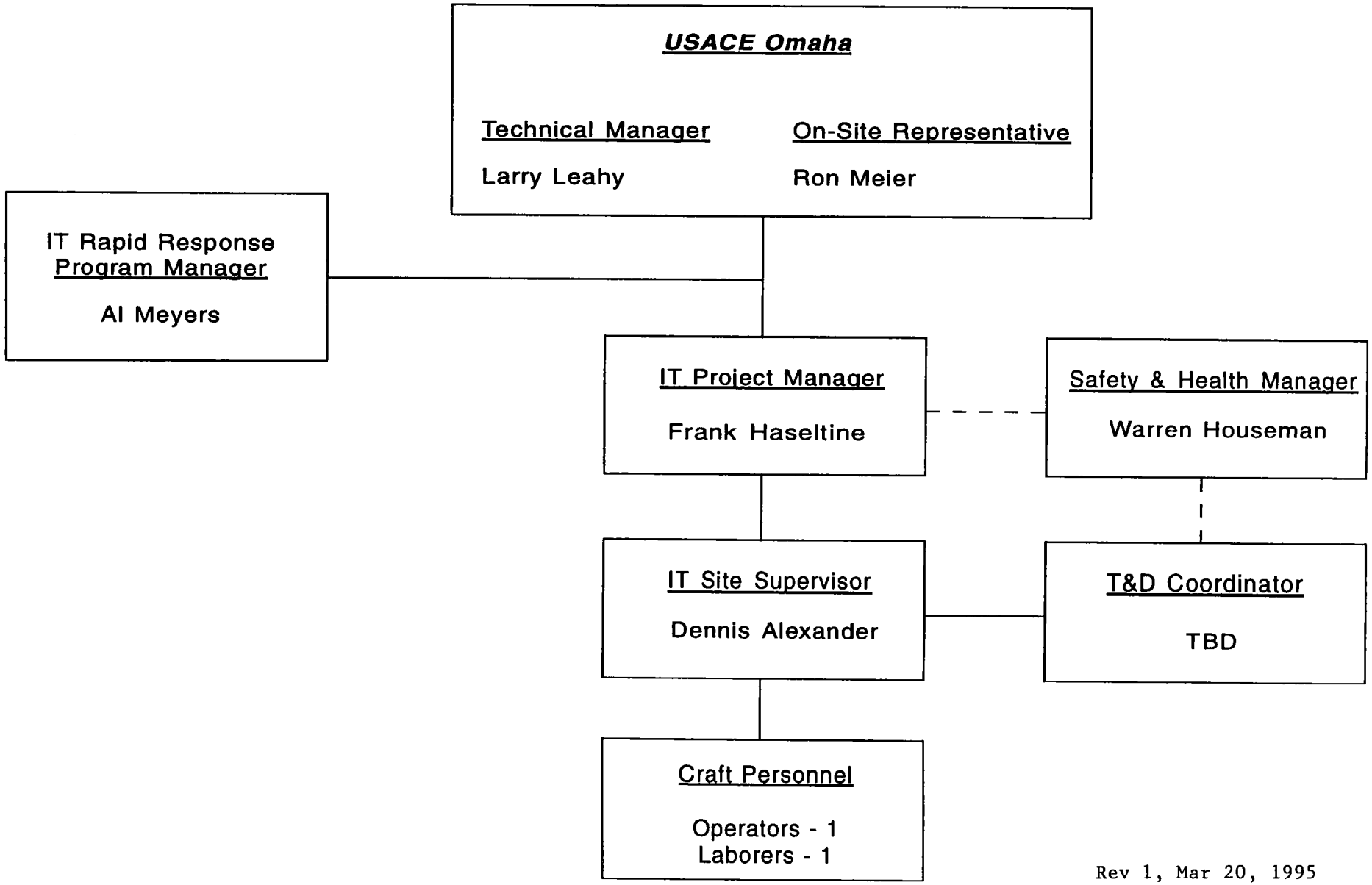
Mr. Frank Haseltine will serve as the Project Manager and will manage all technical and field activities, review all submittals to the USACE, prepare weekly reports and monitor the budget and schedule. Mr. Haseltine is located at IT's regional office in Monroeville, Pennsylvania.

Mr. Dennis Alexander is the proposed on-site Superintendent and will be responsible for maintaining contact with the on-site USACE representative. Mr. Alexander will supervise all on-site activities, prepare the daily submittals and maintain close contact with IT project management.

Mr. Warren Houseman will be the H&S specialist on this project. As H&S specialist, he will oversee/advise on-site supervision and ensure IT's H&S obligations are being met.
Mr. Houseman is located at the Monroeville, Pennsylvania office.

The names of those unknown at the time of preparation of this document, along with the names of the proposed technicians, will be provided immediately upon assignment.

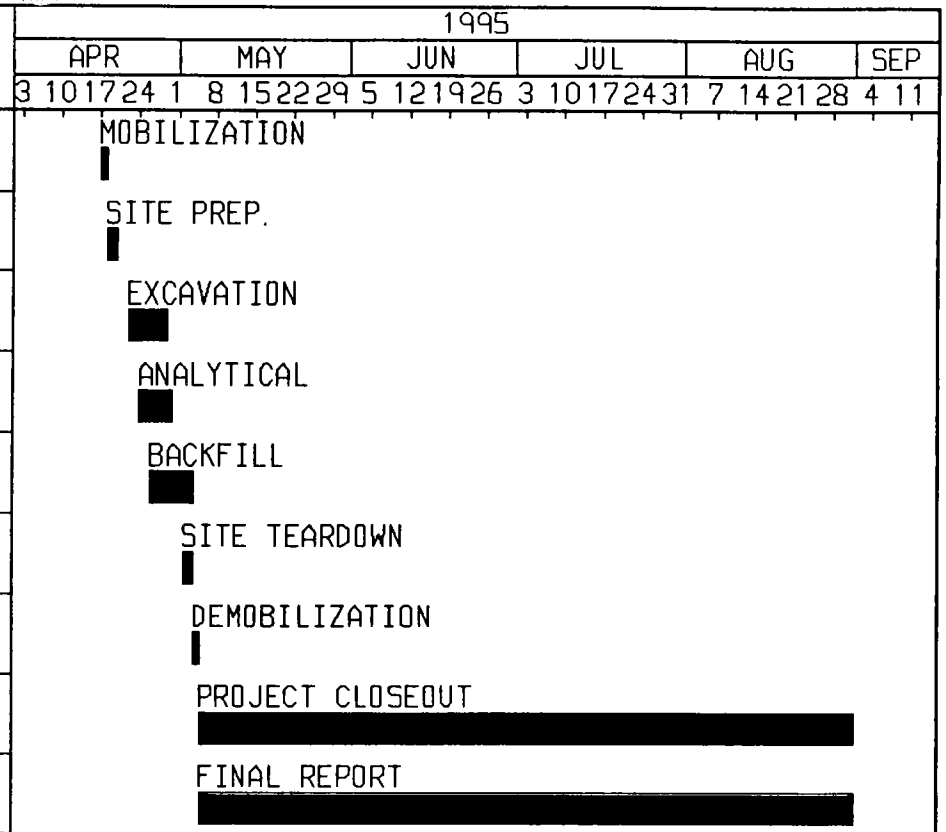
Figure 1 - Key Personnel Organizational Structure
80th Division Removal Action
Ft. Story, Virginia



Rev 1, Mar 20, 1995

Figu 2

ACTIVITY ID	EARLY START	EARLY FINISH	ORIG DUR	REM DUR
01	17APR95	17APR95	1	1
02	18APR95	19APR95	2	2
03	22APR95	28APR95	6	6
04	24APR95	29APR95	6	6
05	26APR95	3MAY95	7	7
06	2MAY95	3MAY95	2	2
07	4MAY95	4MAY95	1	1
08	5MAY95	31AUG95	102	102
09	5MAY95	31AUG95	102	102



Rev 1, Mar 20, 1995

Plot Date 20MAR95
Data Date 10MAR95
Project Start 21FEB95
Project Finish 31AUG95

(c) Primavera Systems, Inc.

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

STRY

Sheet 1 of 1

FORT STORY - PROJECT NO. 716901
USACE - OMAHA
PROJECT SCHEDULE

-----PROJECT SCHEDULE-----

Date	Revision	Checked	Approved

CONTRACTOR SAMPLING AND ANALYSIS PLAN
RAPID RESPONSE ACTIONS
LARC AREA
FORT STORY, VIRGINIA

CONTRACT NO. DACW 45-94-D-0054

***

PREPARED
for
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

***

PREPARED
by
IT CORPORATION
2790 MOSSIDE BOULEVARD
MONROEVILLE, PENNSYLVANIA

Approved by: Raymond A Lion Jr Date: 20 Mar 95
Quality Assurance/Quality Control Manager
IT Corporation

Approved by: Frank T. Hartline Date: March 20, 1995
Contractor Project Manager
IT Corporation

Approved by: _____ Date: _____
Contracting Officer
U.S. Army Corps of Engineers

***

Table of Contents

List of Tables/List of Figures iii

1.0 Introduction 1

2.0 Project Description and Objectives 2
- 2.1 Project Description 2
- 2.2 Project Objectives 2

3.0 Field Sampling Program/Methodology 3
- 3.1 Sampling Program 3
- 3.2 Sampling Equipment/Supplies 3
- 3.3 Sampling Methodology 4
  - 3.3.1 Performance Verification Samples 4
  - 3.3.2 Confirmation Samples 4
  - 3.3.3 IDW Samples 4
- 3.4 Decontamination Supplies/Procedures 5
- 3.5 Disposal of Decontamination Liquids 5

4.0 Sample Handling, Preservation, and Holding Times 6
- 4.1 Sample Handling 6
- 4.2 Sample Preservation, and Holding Times 6

5.0 Documentation, Chain of Custody, and Sample Shipment 7
- 5.1 Documentation 7
  - 5.1.1 Sample Identification 7
  - 5.1.2 Sample Labels 7
- 5.2 Chain of Custody 8
- 5.3 Sample Shipment 8

6.0 Analytical Program 9
- 6.1 Analytical Laboratory 9

Table of Contents *(Continued)*

6.2 Analytical Program/Methods 9
6.2.1 Performance and Confirmation Samples 9
6.2.2 IDW (Decontamination Water) 9
6.3 Laboratory Turnaround Time 10

7.0 Quality Assurance/Quality Control (QA/QC) Program 11
7.1 Field QA/QC Program 11
7.2 QA Samples 11
7.3 MRD Project Identification for QA Samples 11
7.4 Laboratory QC Program 11

8.0 Calibration Procedures/Method Detection Limits 13
8.1 Laboratory Instrument Calibration 13
8.2 Documentation 13
8.3 Method Detection Limits (MDL) 14

9.0 USACE Chemical Quality Data Management Plan 15
9.1 QA Review 15
9.1.1 Inspection of QA Samples 15
9.1.2 Evaluation of Deliverable 15
9.1.3 Data Comparison 15

10.0 Data Assessment, Evaluation, and Reporting 16
10.1 Data Assessment and Evaluation 16
10.1.1 Data Reduction/Verification 16
10.2 Data Reporting 16
10.2.1 Data Report to the QA Laboratory 16

Tables

Figures

List of Tables

Table	Title
1	Summary of Sampling Program
2	Sample Volume Preservation and Holding Times Requirements
3	Summary of Analytical Program and Quantitation Limits
4	Summary of QA/QC Program
5	Acceptable Limits for MS/MSD Samples
6	Acceptable Limits for Surrogate Spikes

List of Figures

Figure	Title
1	Daily Quality Control Reports (DCQR)
2	Sample Labels

1.0 Introduction

This Contractor Sampling and Analysis Plan (CSAP) has been prepared by IT Corporation (IT) for the U.S. Army Corps of Engineers (USACE) Omaha District for rapid response actions (Contract No. DACW 45-94-D-0054, Delivery Order No. 14) at the 80th Division LARC 60 Area, Fort Story, Virginia. This CSAP is based on the following documents:

- USACE guidance document, "Engineering and Design, Chemical Data Quality Management for Hazardous Waste Remedial Activities," Appendix E, ER-1110-1-263, October 1990.

- U.S. Environmental Protection Agency (U.S. EPA), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd Revised Edition, November 1986.

- "Virginia Hazardous Waste Management Regulations," 672-10-01, as amended through September 8, 1993.

- "Scope of Services for Rapid Response Action, Fort Story LARC Area, Fort Story, Virginia," Appendix C, USACE, February 1995.

The CSAP is designed to be a site-specific guidance for the field team for project-required sampling and analysis. The CSAP details all field and laboratory activities and documentation related to chemical data. The CSAP is designed as follows:

- Chapter 2.0 - Project Description and Objectives
- Chapter 3.0 - Field Sampling Program/Methodology
- Chapter 4.0 - Sample Handling, Preservation, and Holding Time
- Chapter 5.0 - Documentation, Chain of Custody, and Sample Shipment
- Chapter 6.0 - Analytical Program
- Chapter 7.0 - QA/QC Program
- Chapter 8.0 - Calibration Procedures/Method Detection Limits
- Chapter 9.0 - USACE Chemical Quality Data Management Plan
- Chapter 10.0 - Data Assessment, Evaluation, and Reporting.

2.0 Project Description and Objectives

2.1 Project Description

The LARC Area is a 50-foot by 70-foot concrete pad surrounded by asphalt. The north side is bordered by sand. Preliminary investigation showed soil contamination of total recoverable petroleum hydrocarbons (TRPH). Low levels of volatile organic compounds (VOC) were detected at a 6-foot depth in this area. Additional samples were collected in September 1994 to further define the extent of contamination and determine disposal options for contaminated material.

Thermal treatment will be performed off-site on the contaminated soil by ENSCI located in Chesapeake, Virginia. All soil contaminated with total petroleum hydrocarbons (TPH) above 100 parts per million (ppm) will be treated. If contamination is present to groundwater, the soil will be removed and treated and the presence of groundwater noted. All debris will be removed and disposed of in accordance with the regulations.

2.2 Project Objectives

The project objectives are as follows:

- The thermally treated material is clean (TPH <100 ppm) and suitable for backfill
- Contaminated material has been excavated from the site and there is no residual contamination remaining
- The investigation-derived waste (IDW) has been properly disposed of.

The project objectives will be met through sampling and analysis as outlined in this CSAP.

3.0 Field Sampling Program/Methodology

3.1 Sampling Program

The following samples will be collected from the site (Table 1):

- Confirmation samples - from excavation area soils from pit bottom and walls
- IDW samples - mainly decontamination water, if necessary.

Other materials present on site, such as debris and/or personnel protective equipment (PPE) will not be sampled. IT will investigate and use generator's knowledge for disposal of these materials.

3.2 Sampling Equipment/Supplies

All sampling equipment will be of disposable stainless steel or Teflon™ and will undergo decontamination procedures in accordance with Virginia regulations, as follows (except for disposable equipment):

- Sampling Equipment
  - Power auger
  - Stainless steel shovel/trowel
  - Stainless steel mixing utensils
  - Gloves (latex)
  - Trash bags
  - Ziplock bags
  - Sample containers
  - Coolers.

Sampling supplies refer to:

- Chain-of-custody forms
- Tape, indelible ink pens
- Field logbook
- Daily Quality Control Report (DQCR) forms.

3.3 Sampling Methodology

3.3.1 Performance Verification Samples

Not used.

3.3.2 Confirmation Samples

Cleanup confirmation samples will be collected from the floor and the walls of the pit excavation. The sampling procedure will be as follows:

- Excavation Pit Floor - It is assumed that the excavation area will be 3 feet deep and no groundwater will be encountered. Within the excavation area, IT will set up a 20-foot by 20-foot grid system marked by stakes. Grab samples will be collected from the center of each grid. The samples will be collected from the surface using a small hand-held trowel. The samples will be transferred directly into sample bottles and preserved. The floor sampling will result in 24 samples. The sampling location will be recorded on a drawing. If groundwater is encountered, soil samples will not be collected.

- Excavation Wall - IT is proposing to collect one grab sample for each 40 linear feet of the side wall. The samples will be collected approximately 1 1/2 feet above the bottom of the pit (assuming pit depth is 3 feet). The sampling locations will be marked at 40-linear-foot intervals along the excavation pit wall. The samples will be collected using a small hand-held shovel and directly transferred into sample bottles. An estimated ten samples will be collected from the side walls.

All samples will be preserved immediately after collection.

3.3.3 IDW Samples

Only decontamination water generated on site will be tested for disposal.

- Decontamination Water - All decontamination water generated on site will be analyzed for disposal. The decontamination water will be stored in the holding tank for testing. For each full holding tank, one water sample will be collected for analyses of disposal parameters. It is estimated that one sample from the holding tank will be collected during the project. The holding tank sampling procedure will be as follows:

  - Open the holding tank discharge valve to flush out the piping

- Collect the discharge water into buckets and transfer back to holding tank

- Collect water sample directly into sample bottle

- Collect VOC samples first, followed by Semivolatile organic compounds (SemiVOC), pesticides/polychlorinated biphenyls (PCB), and metals.

IT will investigate the Army base's wastewater treatment facilities for the disposal of decontamination water and test for the required parameters. If additional analyses are required by a potential off-site transport, storage, and disposal (TSD) facility, IT will inform USACE of these requirements for government approval.

- Other IDW Samples - Disposal of PPE and other waste from the investigation will not require analytical testing. The waste will be disposed of at an off-site TSD facility using generators' knowledge. If additional analysis is required by the TSD facility, IT will inform the USACE of the requirements for government approval.

3.4 Decontamination Supplies/Procedures

Decontamination supplies/procedures consist of the following:

- Nonphosphate laboratory detergent wash and brushing to remove large particles
- Tap water rinse
- Deionized water rinse
- Pesticide-grade isopropanol rinse
- Deionized water rinse.

3.5 Disposal of Decontamination Liquids

All liquids generated during decontamination procedures will be collected and disposed of in accordance with all applicable state of Virginia and federal regulations. The expected analyticals are outlined in Chapter 6.0.

4.0 Sample Handling, Preservation, and Holding Times

4.1 Sample Handling

The samples will be placed in appropriately labeled sample containers, preservatives added (if required), enclosed within a plastic ziplock bag, and placed in a cooler chilled to 4 degrees Centigrade (°C) with double-bagged ice. Once the samples for the day are acquired, the required paperwork will be completed, the cooler packed with fresh coolant and packing material, and custody seals attached, the samples will be shipped or delivered to the designated laboratory. Sample packaging, shipping, and chain of custody will follow all applicable U.S. EPA, USACE, and state of Virginia guidelines. USACE guidelines are outlined in the document, "Sample Handling Protocol for Low, Medium, and High Concentration Samples of Hazardous Waste," (ER-1110-1-263, Appendix E, October 1, 1990). No sample will be held on site for more than 24 hours.

4.2 Sample Preservation, and Holding Times

Samples will be preserved immediately after collection. Sample preservation requirements and holding times are summarized in Table 2.

5.0 Documentation, Chain of Custody, and Sample Shipment

5.1 Documentation

All sample descriptions, field data, and identification will be recorded in permanently bound notebooks, along with Daily Quality Control Reports (DQCR) (Figure 1).

5.1.1 Sample Identification

The following method will be used to label/identify samples, as applicable:

Project Code	Year	Sample Type*	Location**	Sample No.*
FST	95	XX		XXXX

*Sample Type: Describes the matrix of the sample.		**Site No.: Describes from what portion of the site the sample was collected. The following designations shall apply:	
Soil Samples	= SO	Thermal Treatment	= TT
Decontamination Water	= DW	Grid Samples	= GD
		Wall Samples	= WS

5.1.2 Sample Labels

Correct sample labeling and the corresponding notation of the sample identification numbers in the field logbook are necessary to prevent misidentification of samples and their eventual results All sample labels (Figure 2) will be filled out legibly with indelible ink, affixed to the sample bottle, and covered with clear tape. These labels are to include the following, at a minimum:

- Name/initials of the collector
- Date and time of collection
- Place of collection

- Sample identification number (must uniquely identify each sample in regard to project, station, location, etc.)
- Analysis required
- Preservatives added.
- Designation between "grab" or "composite" samples.

5.2 Chain of Custody

Chain of custody shall be maintained for all samples collected. Care will be taken that the information on the chain-of-custody form matches the information on the sample bottles. Chain-of-custody forms will be completed for every cooler, and will be sealed in a ziplock bag and taped to the inside of the lid of the cooler. A minimum of two signed custody seals will be required on the outside of the coolers, one on the front and one on the real of the cooler, both covered with clear tape. Chain-of-custody procedures will be in accordance with USACE sample handling protocol and U.S. EPA procedures.

5.3 Sample Shipment

All samples will be shipped via overnight delivery or hand delivered to Quanterra Environmental Services (Quanterra) laboratory. The laboratory will be notified by the contractor approximately one week prior to the arrival of the first sample shipment and at least 24 hours notice given for Saturday delivery. The samples will be shipped to:

Quanterra Environmental Services
5103 Old William Penn Highway
Export, Pennsylvania 15032
Telephone: (412) 731-8806
Point of Contact: Carrie L. Smith Gamber

6.0 Analytical Program

6.1 Analytical Laboratory

The Quanterra laboratory, located in Export, Pennsylvania will be the analytical laboratory for this project. The laboratory is currently validated by the USACE Missouri River Division (MRD). The laboratory is also certified by state of Virginia.

6.2 Analytical Program/Methods

The analytical program will be constant with the project objectives. The analytical method will be U.S. EPA-approved and consistent with the state of Virginia requirements. Analytical methods are summarized in Table 3 and briefly discussed below.

6.2.1 Performance and Confirmation Samples

Performance and soil confirmation samples will be analyzed for:

- TPH-L
  - Extraction - SW-846 Method 3550
  - Analysis - SW-846 Method 8015 Modified
- TPH-H
  - Extraction and Analysis - SW-846 Method 9071/U.S. EPA 418.1.

Since the state of Virginia requires TPH to be analyzed by U.S. EPA Method 418.1 and the water quality board prefers SW-846 Method 8015, both methods will be used.

6.2.2 IDW (Decontamination Water)

The decontamination water will be analyzed for:

- TPH-L
  - Extraction - SW-846 Method 3550
  - Analysis - SW-846 Method 8015 Modified
- TPH-H
  - Extraction and Analysis - SW-846 Method 9071/U.S. EPA 418.1

At this time, no analysis is planned for other IDW.

6.3 Laboratory Turnaround Time

Required turnaround time for samples submitted to the laboratory will be 24 hours (from the date of receipt of sample).

7.0 Quality Assurance/Quality Control (QA/QC) Program

7.1 Field QA/QC Program

The field QA/QC program is summarized in Table 4. QA/QC samples, consisting of field duplicates, rinsate blanks, trip blanks, and matrix spike/matrix spike duplicates (MS/MSD) samples, will be collected at a rate of 10 percent of the total samples collected. The quality control (QC) samples will be submitted to Quanterra and the quality assurance (QA) samples will be submitted to the USACE MRD laboratory.

7.2 QA Samples

QA samples will be sent to a USACE QA laboratory by overnight delivery for government monitoring of sampling and Quanterra performance. The government (USACE) QA laboratory designated for this project is:

U.S. Army Corps of Engineers
Missouri River Division Laboratory
Attn: CEMRD-EP-LC (Sample Custodian)
420 South 18th Street
Omaha, NE 68102
Telephone: (402) 444-4314

IT will notify the QA laboratory one week prior to the first delivery of samples and at least 24 hours notice will be given for Saturday sample deliveries. (Note: All Saturday deliveries will be scheduled to arrive at the MRD laboratory prior to Noon unless special arrangements can be made in advance with the MRD laboratory). The QA laboratory will also be notified when the final shipment of samples has been sent at the completion of sampling activities.

7.3 MRD Project Identification for QA Samples

IT will add the project identification "MRD LIMS #3174" to labels and chain-of-custody records for all QA samples shipped to the MRD laboratory throughout the duration of this project.

7.4 Laboratory QC Program

IT will perform the QC procedures as described in the reference methods. This includes reagent blanks, laboratory replicates, MS/MSDs, and surrogate standards. If acceptable limits

(Tables 5 and 6) are not met in the first analytical run, the laboratory will rerun the sample to prove matrix affects. Tables 5 and 6 summarize the limits of acceptability for spikes/surrogates and actions to be taken in the event of out-of-control situations.

8.0 Calibration Procedures/Method Detection Limits

Instrument calibration and frequency are consistent with the requirements of the contract and the analytical method.

8.1 Laboratory Instrument Calibration

The analytical laboratory will provide USACE, upon request, the calibrations for GC, GC/MS, general chemistry, metals, organics, and inorganics preparation groups. Instrument calibration should include:

- Operational Calibration - Routinely performed as part of instrument usage, such as the development of a standard curve for use with an atomic absorption spectrophotometer. Operational calibration is generally performed for instrument systems.

- Periodic Calibration - Performed at prescribed intervals for equipment, such as balances and ovens. In general, equipment items that can be calibrated periodically are distinct, single-purpose units and are relatively stable in performance.

Calibration procedures for the analysis of Hazardous Substance List (HSL) constituents should follow the SW-846 protocol.

8.2 Documentation

Documentation pertaining to equipment calibration will be maintained. A calibration schedule will be developed for each piece of field and laboratory equipment and the personnel responsible for that calibration will be identified. All of the tools necessary to calibrate this equipment will be identified and obtained. Instrument-specific calibration/maintenance logbooks will be maintained, which shall include equipment log sheets (bound into the logbook) detailing the following:

- Equipment identification and control number

- Date of calibration and/or maintenance

- Condition of equipment

- All data pertaining to the calibration and/or maintenance including adjustments made and the accuracy of the equipment [prior to and following calibration

- Next due date or time of calibration and/or maintenance

- A record of equipment failure shall be maintained in the equipment logbook including the event initiating maintenance, all maintenance procedures taken, and the dates when the equipment was removed from and returned to service.

8.3 Method Detection Limits (MDL)

Detection limits for the analyses will be according to applicable U.S. EPA methodologies or standard methods, unless otherwise stated. Detection limits are summarized in Table 3 of the CSAP. Data reports will also list specific detection limits for constituents analyzed.

9.0 USACE Chemical Quality Data Management Plan

As required by the USACE, QC and QA samples will be collected and analyzed by Quanterra and the USACE QA laboratory, respectively. The QC and QA samples, which are splits or replicates of the confirmation soil samples, will be collected at a rate of 10 percent with an effort made to locate the sample sin the areas with the highest potential for contamination. For these samples, the samples volume will be sufficient to split into the field sample, the duplicate, and the QA sample. Therefore, three sets of data can then be compared. These samples should be collected in the area with the highest potential for contamination. QC samples help IT and the Quanterra laboratory to identify and diagnose problems related to sampling and analysis.

9.1 QA Review

If at any time throughout the duration of this project it can be demonstrated that chemical quality control contract requirements are not met, the contracting officers' representative (COR) will direct IT to take appropriate corrective action(s). This may include direction requiring that samples be reanalyzed and/or recollected. The following procedures will be performed by the USACE during the ongoing USACE QA review process.

9.1.1 Inspection of QA Samples

The QA laboratory will inspect QA samples to insure that sampling and shipping procedures correspond the chemical data acquisition with regard to sample containers, preservation, labeling, chain of custody, etc.

9.1.2 Evaluation of Deliverable

The USACE will evaluate IT's deliverables specified for the acquisition of data.

9.1.3 Data Comparison

The USACE will analyze all QA samples and then compare analytical results obtained by Quanterra with those obtained by the USACE QA laboratory from split or replicate samples.

10.0 Data Assessment, Evaluation, and Reporting

10.1 Data Assessment and Evaluation

Data assessment and evaluation for this project will be performed by IT. Data, including all QC information, are to be reported on forms as presented in SW-846 (3rd edition). Raw data are not required in the report package. Results for soil samples will be reported on a dry-weight basis.

10.1.1 Data Reduction/Verification

The data reduction/verification process will begin at the analytical laboratory. The verified data will be rechecked for appropriate detection limits, correctness of numbers, footnote units, etc., prior to release. IT will conduct a data validation. The validation process will involve the evaluation of instrument performance, QC sample analysis data, and if needed, review of raw data.

Data reduction will follow the USACE document, "Minimum Chemistry Data Reporting Requirements for DERP and Superfund hazardous toxic waste (HTW) Projects," August 16, 1989.

10.2 Data Reporting

10.2.1 Data Report to the QA Laboratory

The laboratory data for the soil samples will be submitted to the MRD laboratory and the Omaha District for data evaluation and QA/QC comparison within 30 days of receipt of the samples. U.S. EPA SW-846 data report forms will be used. This report package will be submitted separately and will include all sample and internal QC results, such as method blanks, spike and surrogate recoveries, and replicate analyses which shall meet or exceed the HTW minimum data reporting requirements. The following are minimum data reporting requirements:

- Sample Identification - IT will prepare a tabular presentation which matches laboratory sample identifications to QA laboratory sample identification. This table will identify all field duplicates and field blanks as such and match with their corresponding field samples, where applicable.

- Sample Receipt - Quanterra will complete and report a "Cooler Receipt Form" for all shipments for purposes of noting problems in sample packaging, chain of custody, and sample preservation.

- General Organic and Inorganic Reporting - For each analytical method run, IT will report all analytes for each sample as a detected concentration or as less than the specific limits of quantitation. Each analytical method run shall be clearly identified as belonging to a specific analytical batch. All samples with out-of-control spike recoveries being flagged for matrix interferences will be designated as such. Appropriate data flags such as the Contract Laboratory Program (CLP) will be used. All soil samples will be reported on a dry-weight basis with percent moisture also reported unless otherwise approved. IT will also report dilution factors for each sample as well as the date of extraction (if applicable) and date of analysis.

- Internal QC Reporting - A complete set of QC results will be reported for each analytical batch even if some of the QC wa snot performed on samples form this USACE project. The QC results will include laboratory blanks, surrogate and MS recoveries, laboratory duplicates and/or MSD pairs.

  Internal QC samples will be analyzed at rates specified in the specific methods or higher rates if required to meet project-specific objectives.

- QA/QC Problems - All QA/QC problems in the field or in the laboratory will be reported immediately to the USACE on-site construction representative and to the USACE project chemist within 24 hours.

TABLES

Table 1

Summary of Sampling Program
Rapid Response Actions
LARC Area
Fort Story, Virginia

Sample Description	Sample Location	Sample Matrix	Sample Frequency	Estimated No. of Samples Collected
Performance Samples (Postthermal Treatment)	Stockpile	Soil	1 composite/250 tons (total estimated volume of soil thermally treated = 4,500 tons)	18[a] (collected by IT) 18 (collected by Purgo)
Confirmation Samples	Excavation Area			
	• Pit Bottom	Soil	1 sample/20-sq-ft grid pattern	24
	• Sidewalls	Soil	1 sample/40 linear ft of wall (~1.5 ft from pit bottom)[b]	10 (total 24)
Investigation Derived Waste Disposal Samples (Decontamination Water)	Holding Tank/Drums	Water	1 sample/tank full	1

[a]Twelve samples will be analyzed by IT; remaining six samples will be archived.
[b]Assuming excavation depth of 3 feet.

Table 2

Sample Volume Preservation and Holding Times Requirements[a]
Rapid Response Actions
LARC Area
Fort Story, Virginia

Sample Description	Analytical Parameters	Sample Volume and Container	Preservation	Holding Times
Performance Samples	TPH-L	8-oz glass jar with Teflon™ Septa	Cool 4°C	14 days
Confirmation Samples	TPH-H	8-oz glass jars	H_2SO_4, pH <2.0, Cool 4°C	28 days
Decontamination Water	VOCs	2 x 40 ml glass vials with Teflon™ Septa	HCl <pH 2.0, Cool, 4°C	14 days (extraction) 7 days (analysis)
	SemiVOCs	2 x 1L amber glass bottle	0.008 percent, $Na_2S_2O_3$, Cool, 4°C	
	Pesticides/PCBs	2 x 1L amber glass bottle	Cool, 4°C	
	Total Metals	1 x 1L plastic	HNO_3 <pH 2.0, Cool, 4°C	6 months (except Hg - 28 days)

[a]"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 3rd Revised Edition, November 1986.

Table 3

Summary of Analytical Program and Quantitation Limits
Rapid Response Actions
LARC Area
Fort Story, Virginia

Sample Description	Analytical Parameter	Analytical Method[a]	Estimated Quantitation Limits
Performance Samples	TPH-L	SW-846 Methods 3550/8015 modified for combination of gasoline and diesel fuel standards	5 mg/kg (DRO/GRO)
Confirmation Samples	TPH-H	SW-846 Methods 9071/418.1[b]	10/17 mg/kg
Investigation Derived Waste Disposal Samples (Decontamination Water)	VOCs	SW-846 Methods 5030/8240A	5-10 ug/ℓ
	SemiVOCs	SW-846 Methods 3510-20/8270A	10-200 ug/ℓ
	Total Metals	SW-846 Methods 3005A/3010A/6010	0.3-75 ug/ℓ
	Pesticides/PCBs	SW-846 Methods 3510-20/8080	0.01-2.4 ug/ℓ (MDL)

[a]"Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 3rd Revised Edition, November 1986, or as indicated.
[b]"Methods for Chemical Analysis of Water and Wastes," U.S. EPA 600/4-79-020, March 1983.

Table 4

Summary of QA/QC Program
Rapid Response Actions
LARC Area
Fort Story, Virginia

Sample Description	QC Samples						QA Samples[a] (Duplicate Split)
	No. of Field Samples	Duplicate	MS/MSD	Rinsate Blank	Trip Blank	Total	
Performance Samples	12	2	2	2	-	18	2
Confirmation Samples	24	3	3	-	-	30	3
Investigation Derived Waste, Disposal Samples (Decontamination Water)	1[b]	-	1	-	1	3	-
TOTAL	37	5	6	2	1	51	5.00

[a]QA samples will be split of field samples and sent to USACE laboratory. Refer to Section 7.2 for details.
[b]Assuming <5,000 gallons of water will be generated during the project, resulting in one sample collection.

Table 5

Acceptable Limits[a] for MS/MSD Samples
Rapid Response Actions
LARC Area
Fort Story, Virginia

TPH (% Recovery)	VOCs (% Recovery)	SemiVOCs (% Recovery)	Pesticides/PCBs (% Recovery)	Metals (% Recovery)
TFH-L SW-846 Methods 3550/8015 TFH-H SW-846 Methods 9071/418.1	SW-846 Method 8240 (Water)	SW-846 Method 8270 (Water)	SW-846 Method 8080 (Water)	SW-846 Method 6010 (Soil/Water)
Limits TPH-L = 80-120 TPH-H = 80-120	1,1-Dichloroethene (61-145) Trichloroethene (71-120) Chlorobenzene (75-130) Toluene (76-125) Benzene (76-127	1,2,4-Trichlorobenzene (39-98) Acenaphthene (46-118) 2,4-Dinitrotoluene (24-95) Di-n butylphthalate (11-117) Pyrene (26-127) N-nitroso di-n (41-116) Propylamine (41-116) 1,4-Dichlorobenzene (36-97) Pentachlorophenol (9-103) Phenol (12-89) 2-Chlorophenol (27-123) 4-Chloro-3-methyl phenol (23-97) 4-Nitrophenol (10-80)	Lindane (56-123) Heptachlor (40-131) Aldrin (40-120) Dieldrin (52-126) Endrin (56-121) 4,4-DDT (38-127)	75-125
Out of Control Actions[b]				
• Reanalyze samples • Qualify data	• Reanalyze samples • Qualify data	• Reanalyze samples • Qualify data	• Reanalyze samples • Qualify data	• Recovery out of control limits - qualify data J/UJ • Recovery <30% - qualify data R

[a]Limits from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 3rd Revised Edition, November 1986.
[b]Based on "Functional Guidelines for Evaluating Organics/Inorganics Data," U.S. EPA 2/88, 7/88, Hazardous Waste Evaluation Division.

J = Estimated value
UJ = Nondetect estimated value
R = Unusable Data.

Table 6

Acceptable Limits[a] for Surrogate Spikes
Rapid Response Actions
LARC Area
Fort Story, Virginia

TPH (Soils, % Recovery)		VOCs (% Recovery)	SemiVOCs (% Recovery)	Pesticides/PCBs (% Recovery)
TPH-L SW-846 Methods 3550/8015	**TPH-H SW-846 Methods 9071/418.1**	**SW-846 Method 8240 (Water)**	**SW-846 Method 8270 (Water)**	**SW-846 Method 8080 (Water)**
<u>Limits</u> Trifluorotoluene (50-150)	-	Toluene-d8 (88-110) Bromofluorobenzene (86-115) 1,2,-Dichloroethane-d4 (76-114)	Nitrobenzene-d5 (35-114) 2-Fluorobiphenyl (43-116) Terphenyl-d14 (33-141) Phenol-d5 (10-84) 2-Fluorpohenol (21-100) 2,4,6-Tribromophenol (10-123)	Di-butylchlorendate (24-154) Tetrachloro-m-xylene (25-154)
Out of Control Actions[b]				
• Reanalyze samples • Surrogate >10% - qualify data J/UJ • Surrogate <10% - qualify data J/R	-	• Reanalyze samples • Surrogate >10% - qualify data J/UJ • Surrogate <10% - qualify data J/R	• Reanalyze sample if 2 or more surrogates out • Surrogate >10% - qualify data J/UJ • Surrogate <10% - qualify data J/UJ	• Reanalyze sample • Recovery out of control limits - qualify data J/UJ • Recovery <10% - qualify data R

[a]Limits from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 3rd Revised Edition, November 1986.
[b]Based on "Functional Guidelines for Evaluating Organics/Inorganics Data," U.S. EPA 2/88, 7/88, Hazardous Waste Evaluation Division.

J = Estimated value
UJ = Nondetect estimated value
R = Unusable data

FIGURES

Daily Quality Control Report

Page___of___
Date_____

I. Analytical Samples Collected

Total Number Collected: [ ]

Total Ash Samples: [ ]

Total Water Samples: [ ]
Bayou water: [ ]
Treatment Plant: [ ]
Groundwater: [ ]
Stormwater: [ ]

Nonroutine analytical parameters:
Unusual Weather Conditions:

II. Field Measurements

Total field measurements: [ ]

pH measurements: [ ]
DO measurements: [ ]

Calibrations successful? [ ]
If no, explain corrective actions:

II. Nonconformances

Total Number of nonconformances: [ ]
Cause/Action taken:

Number of sampling nonconformances: [ ]
Cause/Action taken:

Number of analytical nonconformances: [ ]
Cause/Action taken:

Miscellaneous Comments:

Figure 1

Daily Quality Control Report

IT CORPORATION

Project Name _____

Project No. _____

Sample No. _____

Collection Date/Time _____

Collector's Name _____

Sample Location _____

Sample Type/Depth/Description _____

_____ Preservative _____

Analyze For _____

Bottle _____ of _____ _____ Filtered _____ Nonfiltered

Figure 2

Example - Sample Field Label

Proposal No. 519201
February 1995

Site Operation Safety Plan
Soil Removal, 80th Division LARC 60 Area
Ft. Story, Virginia
Contract No. DACW45-94-D-0054

Prepared for:

U.S. Army Corps of Engineers
Omaha District, 215 N. 17th Street
Omaha, Nebraska 68102-4978

Prepared By:

IT Corporation
2790 Mosside Boulevard
Monroeville, Pennsylvania 15146-2792

Table of Contents

List of Tables . . . . . B-vi
List of Acronyms . . . . . B-vii
1.0 Introduction B-1
1.1 Objectives B-1
1.2 Site Description and Contamination Characterization B-1
1.3 Policy Statement B-2
1.4 References B-3
2.0 Responsibilities B-6
2.1 All Personnel B-6
2.2 Safety and Health Manager B-6
2.3 Project Manager B-6
2.4 Site Safety and Health Officer B-7
2.5 Site Supervisor B-7
2.6 Subcontractors, Visitors, and Other On-Site Personnel B-8
3.0 Job Hazard Analysis B-9
3.1 Scope of Work B-9
3.2 Job Hazard Assessment by Task B-9
3.2.1 Task 1: Mobilization/Demobilization B-9
3.2.2 Task 2: Excavation of Soil B-11
3.2.3 Task 3: Thermal Treatment of Contaminated Soil B-15
3.2.4 Task 4: Confirmation Soil Sampling B-17
3.2.5 Task 5: Backfilling of LARC Area B-19
3.2.6 Task 6: Site Teardown B-21
3.3 Heat Stress Signs and Symptoms B-21
3.4 Signs and Symptoms of Cold Stress B-22
3.5 Hazardous and Toxic Materials B-23
3.6 Exposure Standards B-24
3.7 Biological Hazards B-25
4.0 Standard Operating Safety Procedures, Engineering Controls, and Work Practices . B-27
4.1 General Practices B-27
4.2 Operation of Heavy Equipment B-30
4.2.1 Equipment Decontamination B-31

4.3 Fall Protection B-32
4.4 Project Specific Practices B-32
4.5 Heat Stress Prevention B-32
4.5.1 Heat Stress B-32
4.6 Hearing Conservation B-34
4.7 Excavation Safety B-34
4.8 Sanitation B-35
4.8.1 Potable Water B-36
4.8.2 Nonpotable Water B-36
4.8.3 Trash Collection B-36
5.0 Personal Protective Equipment B-37
5.1 Respiratory Protection Program B-37
5.2 Levels of Protection B-38
5.2.1 Level C Protection B-38
5.2.2 Level D Protection B-39
5.3 Using Personal Protective Equipment B-39
5.3.1 Donning Procedures B-40
5.3.2 Doffing Procedures B-40
5.4 Selection Matrix B-41
6.0 Site Control Measures B-42
6.1 Support Zone B-42
6.2 Contamination Reduction Zone B-42
6.3 Exclusion Zone B-42
6.4 Emergency Entry and Exit B-42
6.5 Site Entry Requirements B-43
6.6 Posting Site B-43
7.0 Decontamination B-44
7.1 Procedures for Equipment Decontamination B-44
7.2 Personnel Decontamination B-44
8.0 Site Monitoring B-47
8.1 Air Monitoring B-47
8.1.1 Locations to be Monitored B-47

8.1.2 Frequency B-48
8.1.3 Air Monitoring Equipment B-48
8.1.4 Monitoring Equipment Maintenance and Calibration B-48
8.2 Noise Monitoring B-49
8.3 Heat Stress B-49
8.4 Safety Review B-49
8.5 Monitoring Records B-49
9.0 Employee Training B-51
9.1 General B-51
9.1.1 Tailgate Safety Meetings B-51
9.1.2 Material Safety Data Sheets B-52
9.1.3 Site-Specific SSHP B-52
9.2 Site Workers' Basic Course B-52
9.3 Supervisors' Course Content B-53
9.4 Site-Specific Training B-53
9.5 First Aid and Cardiopulmonary Resuscitation B-53
9.6 Instructors B-53
10.0 Medical Surveillance B-54
10.1 Medical Examination B-54
10.1.1 Placement Examination B-55
10.1.2 Annual Examination B-55
10.1.3 Exit Examination B-55
10.2 First Aid and Medical Treatment B-55
10.3 Medical Restriction B-56
10.4 Medical Records B-56
11.0 Emergency Procedures B-57
11.1 General B-57
11.2 Emergency Procedures B-57
11.3 Safety Signals B-57
11.4 Medical Emergency B-58
11.4.1 Chemical Inhalation B-58
11.4.2 Eye Contact B-58

11.4.3 Skin Contact B-58
11.4.4 Personal Injury Accident B-58
11.5 Fire or Explosions B-59
11.6 Spills or Leaks B-59
11.7 Evacuation Routes B-59
11.8 Emergency Information B-60
11.8.1 Public Agencies B-60
11.8.2 Key Project and IT Personnel B-60
12.0 Record Keeping and Data Management B-62
13.0 Exposure Control Plan B-64
13.1 Definition B-64
13.1.1 Hepatitis B Virus B-64
13.1.1.1 Hepatitis Exposure Symptoms B-64
13.1.2 Human Immunodeficiency Virus B-64
13.1.2.1 Human Immunodeficiency Virus Exposure Symptoms . . . B-65
13.2 Exposure Determination B-65
13.2.1 Means of Transmission B-65
13.3 Measures for Prevention B-66
13.3.1 Universal Precautions B-66
13.3.2 Engineering Controls B-66
13.3.3 Work Practice Controls B-66
13.3.3.1 Minimization of Contact B-67
13.3.4 Personal Protective Equipment B-68
13.3.5 Waste Handling B-68
13.3.6 Waste Disposal B-68
13.4 Medical Requirements B-68
13.4.1 Hepatitis B Vaccination B-68
13.4.2 Postexposure Procedures and Evaluation B-69
13.4.2.1 Documentation Procedures B-69
13.4.2.2 Blood Testing B-69
13.4.2.2.1 Source Individuals B-69
13.4.2.2.2 Exposed Employees B-69

13.4.3 Postexposure Medical Evaluations B-70
13.5 Hazard Communication B-70
13.5.1 Warning Labels B-70
13.5.2 Warning Signs B-70
13.5.3 Employee Training Program B-70
13.6 Recordkeeping B-70
13.6.1 Training Records B-70
13.6.2 Medical Records B-71
13.6.2.1 Maintenance and Transfer of Records B-71
13.6.3 Incident Recording B-71
Tables
Appendix A - Subcontractor Certification
Appendix B - Chemical Information
Appendix C - Site and Hospital Location Maps
Appendix D - Underground/Overhead Utility Checklist

List of Tables

Table	Title
1	Toxicological Data
2	PPE Selection Matrix
3-1	Action Levels
3-2	Air Monitoring Frequency and Location

List of Acronyms

Acronym	Title
°F	degrees Fahrenheit
ABC	airway, breathing, and circulation
ABIH	American Board of Industrial Hygiene
ACGIH	American Conference of Governmental Industrial Hygienists
AHA	activity hazard analysis
ANSI	American National Standards Institute
APR	air-purifying respirator
BZ	breathing zone
CBC	complete blood count
CFR	Code of Federal Regulations
CGI	combustible gas indicator
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
CTPV	Coal Tar Pitch Volatile
dBA	A-weighted decibel
EKG	electrocardiogram
EPA	U.S. Environmental Protection Agency
EZ	exclusion zone
FID	flame ionization detector
FM	Factory Mutual
GFCI	ground fault circuit interrupter
HSM	Health and Safety Manager
IDLH	immediately dangerous to life and health
IT	IT Corporation
kV	kilovolt
LEL	lower explosive limit
LTTD	low temperature thermal desorber
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MSA	Mine Safety Appliances Company
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon
PEL	permissible exposure limit

List of Acronyms *(continued)*

Acronym	Title
PM	Project Manger
PPE	personnel protective equipment
ppm	parts per million
SM	Site Manager
SMAC 24	Sequential Multiple Analyzer Computer
SOSP	Site Operation Safety Plan
SRCPP	Solvent Refined Coal Pilot Plant
SSHO	Site Safety and Health Officer
STEL	short-term exposure limit
SZ	support zone
TGH	Tacoma General Hospital
TLV	Threshold Limit Value
TPH	total petroleum hydrocarbons
TWA	time-weighted average
$\mu g/m^3$	micrograms per cubic meter
UL	Underwriters Laboratories
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
VOC	volatile organic compound
WBGT	Wet-Bulb Globe Temperature

Soil Removal
80th Division LARC 60 Area
Ft. Story, Virginia
Site Operation Safety Plan Approvals

I have read and approved this SOSP with respect to project hazards, regulatory requirements, and IT procedures.

Frank T. Hazelhurst — 2/15/95
Date

Project Manager

Warren C. Houseman — 2-10-95
Date

Health and Safety Manager

SITE SAFETY AND HEALTH PLAN ACKNOWLEDGEMENT FORM

I have been informed of, and will abide by the procedures set forth in the Site Safety and Health Plan and its Amendments for the Fort Story site.

Printed Name	Signature	Representing	Date

1.0 Introduction

1.1 Objectives

This Site Safety and Health Plan (SSHP) describes the health and safety (H&S) guidelines developed to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials at Fort Story. The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements may be revised if new information is received or conditions change. A written amendment will document all changes made to the plan. Where appropriate, specific Occupational Safety and Health Administration (OSHA) standards or other guidance documents will be cited and applied. This document and amendments to it will be made available to the Contracting Officer (CO).

All site operations will be performed in accordance with applicable state, local and IT Corporation (IT) corporate regulations and procedures, OSHA requirements, and U.S. Army Corps of Engineers (USACE) requirements. All IT employees and subcontractors must comply with the requirements of this plan.

1.2 Site Description and Contamination Characterization

Fort Story is located on Cape Henry in Virginia Beach, Virginia. Fort Story is bounded by the Chesapeake Bay and the Atlantic Ocean to the west, north, and east, and by Seashore State Park to the south. The subject site, the 80th Division LARC 60 Area, is located northeast of the intersection of Da Nang and Hospital Roads.

The subject site operates as an amphibious landing craft (LARC) washing and maintenance area. The site contains a 50-foot by 70-foot concrete pad, surrounded by asphalt on the west, south, and east sides. The north side is bordered by sand of the LARC staging area. The north side of the site is bounded by a mix of open and semi-wooded sand flats and sand ridges. A 1,000-gallon used oil UST, 250-gallon antifreeze AST and former drum storage area are located west of the wash pad. The AST is located on a raised, bermed concrete pad with a valved outlet for water drainage.

1.3 Policy Statement

It is the policy of IT to provide a safe and healthful work place for all employees, subcontractors, and clients in compliance with governmental requirements. Additionally, the requirements of our clients shall take precedence provided that their requirements exceed those of IT and governmental regulations.

> *We believe in two fundamental principles of safety: all accidents, injuries, and occupational illnesses are preventable; and if an operation cannot be done safely, we will not do it.* To put these principles into practice, every associate will receive the appropriate training, equipment, and other resources necessary to complete assigned tasks in a safe and efficient manner.

Safety, industrial hygiene, and loss prevention are the direct responsibility of all members of management, who must create an environment in which everyone shares a concern for their own safety and the safety of their associates. Safety shall take precedence over expediency or short cuts. It is a condition of employment that all employees work safely and follow established safety rules and procedures.

Managers must conduct their businesses in compliance with governmental safety regulations and company procedures. All IT health and safety procedures must be implemented for all IT employees on all projects where IT is the subcontractor, or a joint venture partner. If IT is the prime contractor, IT procedures shall be applied to all IT and subcontractor personnel.

> *The implementation of effective health and safety practices is a key measure of managerial performance.* Management, with the assistance of the internal health and safety professional staff, will conduct audits to assess the effectiveness of the safety program(s) in place, and to identify areas for improvement. All deficiencies shall be corrected promptly.

All injuries, occupational illnesses, vehicle accidents, and incidents with potential for injury or loss will be investigated. Appropriate corrective measures will be taken to prevent recurrence, and to continually improve the safety of our work place.

1.4 References

This SSHP complies with applicable OSHA and the U.S. Environmental Protection Agency (EPA) regulations. This plan follows the guidelines established in the following:

- Standard Operating Safety Guidelines (EPA, November 1984)
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (National Institute of Occupational Safety and Health [NIOSH] 85-115)
- Title 29 of the Code of Federal Regulations (CFR), Part 1926.65, U.S. Department of Labor (DOL)/OSHA
- Title 29, CFR, Part 1910, Occupational Safety and Health Standards, Revised July 1, 1990
- Title 29, CFR, Part 1926, Safety and Health Regulations for Construction, Revised July 1, 1990
- U.S. Army Corp of Engineers, Safety and Health Requirements Manual, EM 385-1-1, April 1981, Revised October 1992
- NIOSH, Pocket Guide to Chemical Hazards, Publication No. 90-117, Revised 1990
- ACGIH, Threshold Limit Values and Biological Exposure Indices for 1993-1994.
- NIOSH/OSHA, Occupational Health Guidelines for Chemical Hazards, U.S. Department of Health and Human Services, NIOSH Publication No. 81-123, January 1981, Supplemented 1988.

The contents of this plan are consistent with the following IT H&S policies and procedures:

- HS001 Safety Policy
- HS002 Safety Policy: International Operations
- HS010 Employee Safety and Health Works Rules
- HS011 Contractor Safety and Health Rules
- HS013 Health and Safety Procedure Variances

- HS018 Safety Councils
- HS019 Injury and Illness Prevention Program
- HS020 Accident Prevention Program: Reporting, Investigation, and Review
- HS021 Accident Prevention Program: Management Safety Audits and Inspections
- HS022 Accident Prevention Program: Review of New Proposals, Projects, Operations, and Construction
- HS040 Stop Work Authority
- HS041 Embryo-Fetus Protection Program
- HS050 Training Requirements
- HS051 Tailgate Safety Meetings
- HS052 Health and Safety Plans
- HS060 Hazard Communication Program
- HS080 Insurance Claims
- HS090 OSHA Regulatory Inspections
- HS091 Serious Injury and Fatality Reporting Requirements
- HS092 Occupational Injury and Illness Recordkeeping
- HS100 Medical Policies and Procedures
- HS101 Drug and Alcohol Testing
- HS102 Access to Employee Exposure and Medical Records
- HS103 Maintenance of Employee Exposure and Medical Records
- HS104 Employee Notification of Industria Hygiene Monitoring Results
- HS105 Occupational Injuries/Illnesses Procedures

- HS106 First Aid Kits
- HS300 Confined Spaces, Industrial
- HS303 Hydroblasting
- HS304 Compressed Gas
- HS305 Pressurized Systems
- HS307 Excavation and Trenching
- HS310 Hazardous Waste Operations at Uncontrolled Waste Sites
- HS314 Hot Work in Hazardous Locations
- HS400 Working in Hot Environments
- HS401 Cold Stress
- HS402 Hearing Conservation Program
- HS512 Handling of Blood or Other Potentially Infectious Materials
- HS600 Personal Protective Equipment
- HS601 Respiratory Protective Program
- HS602 Eye Protection - Prescription Safety Glasses
- HS604 Use and Maintenance of Portable Electrical Equipment
- HS800 Motor Vehicle Operation: General Requirements
- HS810 Commercial Motor Vehicle Operation and Maintenance

2.0 Responsibilities

2.1 All Personnel

Each person is responsible for the H&S of themselves and their coworkers, for completing tasks in a safe manner, and reporting any unsafe acts or conditions to their supervisor and/or the site supervisor (SS). All personnel are responsible for continuous adherence to these H&S procedures during the performance of their work. No person may work in a manner that conflicts with the letter or the intent of, or the safety and environmental precautions expressed in these procedures. After due warnings, IT will dismiss from the site any person who violates safety procedures. IT's employees and subcontractors are subject to progressive discipline and may be terminated for blatant or continued violations. All on-site personnel will be trained in accordance with 29 CFR 1926.65 and this document.

2.2 Safety and Health Manager

The safety and health manager (SHM) is responsible for the development, implementation, and oversight of the Safety and Health Program and the SSHP. The SHM may designate a fully-trained and experienced individual, such as the SS, to implement and continually enforce safety policies and activities on site.

The SHM will have a minimum of four years of experience relevant to hazardous waste operations and occupational H&S. The SHM will have a college degree in H&S or a related field. Certification in Industrial Hygiene by the American Board of Industrial Hygiene (ABIH) is desired.

2.3 Project Manager

The PM is ultimately responsible for ensuring that all project activities are completed in accordance with requirements set forth in this plan. The PM must perform at least one on-site safety review during the project. The PM is responsible for ensuring all accidents and incidents on the project are reported and thoroughly investigated. The PM must approve in writing any addenda or modifications of the SSHP.

The PM is responsible for ensuring that the necessary personnel are available for this project and that the reporting, scheduling, and budgetary obligations for this project are met.

2.4 Site Safety and Health Officer

The SSHO is responsible for providing technical assistance to the SS with respect to H&S matters. The SSHO will conduct daily inspections to determine if operations are being conducted in accordance with the SSHP, USACE contract requirements, EPA H&S guidelines, and OSHA requirements. The SSHO will report to the SHM and the SS. In the absence of a SSHO, the SS will assume the responsibilities of the SSHO.

2.5 Site Supervisor

The SS will be responsible for field implementation of the SSHP plan. This will include communicating site requirements to all on-site project personnel (both IT and subcontractor personnel) and consultation with the SSHO. The SS will be responsible for informing the SSHO and the PM of any changes in the work plan, so that those changes may be properly addressed. The SS, as the on-site representative of IT, is responsible for maintaining contact with the USACE representative, the SHM, and the PM. The SS is also responsible for coordinating and enforcing H&S activities for all individuals on site at all times. The SS will report to the PM and work directly with the USACE representative.

The SS will have a minimum of two years of field experience and supervisory experience. The SS will have completed an Eight-Hour Supervisor course as required by 29 CFR 1926.65, in addition to complying with the site entry requirements described in Section 6.5.

Other responsibilities include:

- Enforcing the requirements of the SSHP. This includes performing daily safety inspections of the work site.
- Stopping work, as required, to ensure personal safety and protection of property, or where life- or property-threatening noncompliance with safety requirements is found.
- Determining and posting routes to capable medical facilities and emergency telephone numbers (including poison control facilities) and arranging emergency transportation to medical facilities.
- Notifying local public emergency officers of the nature of the site operations, and posting of their telephone numbers in an appropriate location.
- Observing on-site project personnel for signs of chemical or physical trauma.

- Ensuring that all site personnel have been given the proper medical clearance, ensuring that all site personnel have met appropriate training requirements and have the appropriate training documentation on site, and monitoring all team members to ensure compliance with the SSHP.

2.6 Subcontractors, Visitors, and Other On-Site Personnel

Subcontractors are responsible for the H&S of their employees and for complying with the standards established in this SSHP. Subcontractors are required to follow the guidelines established in IT's General Safety Rules for Contractors and this SSHP. Subcontractors will report to the SS.

If there is any dispute with regard to H&S, the on-site staff will attempt to resolve the issue. If the issue cannot be resolved, they will consult off-site technical staff and supervisors for assistance. The specific task or operation in question shall not be discontinued until the issue is resolved. All subcontractors, visitors, and other on-site personnel must check in with the SS prior to gaining access to the site, in order to verify that appropriate entry requirements are met. Each person is responsible for their own H&S, for completing tasks in a safe manner, and for reporting unsafe acts or conditions to his/her supervisor or the IT representative. Refer to Appendix A.

3.0 Job Hazard Analysis

3.1 Scope of Work

IT will provide the necessary labor material and equipment to remove the petroleum contaminated soils from the LARC area. The scope consists of:

- Site mobilization/demobilization
- Soil excavation
- Thermal treatment of contaminated soils
- Confirmation soil sampling
- Backfilling.

3.2 Job Hazard Assessment by Task

The hazard assessment identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community, and the environment. Because of the complexity and constant change of remediation projects, supervisors must continually inspect the work site to identify hazards which may harm site personnel, the community, or the environment. The PM, Project Engineer, SS, and SSHO must be aware of these changing conditions and discuss them with the SHM. The SHM will write addenda to change Job Safety Analyses and associated hazard controls as necessary. The site-specific Material Safety Data Sheets (MSDS) are included in Appendix B.

All IT personnel and subcontractors will be familiar with these associated hazards, with each task, and strictly adhere to the appropriate safety procedures. The potential hazards and the appropriate controls will be presented to project personnel during daily Tailgate Safety Meetings. The site-specific chemical hazards are outlined in Table 1. For task-specific personal protective equipment (PPE), refer to Table 2.

3.2.1 Task 1: Mobilization/Demobilization

Physical Hazards. During this phase of the operation, employees will be exposed to slip and trip hazards. Heat stress is also a potential concern; however, during this phase of the operation, heat stress exposure will be minimal. Refer to Section 4.5.1 for a discussion of heat stress.

Noise may also present a hazard since equipment operation frequently results in noise levels exceeding 85 decibels (dB), requiring the use of hearing protection.

- **Installation of support structures**

  - Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift. Recommend wearing a back support if possible.

  - Good housekeeping, keep work area picked up and clean as feasible. Continually inspect the work area for slip, trip and fall hazards.

  - Hearing protection is mandatory above 85 dBA.

  - Hardhat, stay alert and clear of materials suspended overhead, steel-toed boots.

  - Safety glasses/eye wash.

  - Keep hands and feet clear of moving/suspended materials and equipment.

  - Stay alert at all times!

  - Beware of contact points.

  - Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

  - Mobile/portable facilities shall be anchored to withstand high winds.

- **Delineate work zones**

  - Continually inspect work area for slip, trip, and fall hazards.

  - Inspect work area carefully and avoid placing hands and feet into concealed areas.

Utility Hazards. The presence of overhead utilities, such as power lines, requires careful positioning of the excavator in order to maintain at least 20 feet of distance (25 feet if sagging) between the lines and the closest part of the equipment. Underground utilities must be marked and located prior to and during excavation activities. Refer to Appendix D, Underground/Overhead Utilities.

Chemical Hazards. The potential chemical hazards involved at the site are related to inhalation of acetone and toluene via dust.

3.2.2 Task 2: Excavation of Soil

Physical Hazards.

- **Excavation of potentially contaminated soil**

  - Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.

  - Equipment shall be inspected before being placed into service and at the beginning of each shift.

  - Preventive maintenance procedures recommended by the manufacturer shall be followed.

  - All lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

  - Machinery and mechanized equipment shall be operated only by designated personnel.

  - Getting off or on any equipment while it is in motion is provided.

  - Machinery or equipment requiring an operator shall not be permitted to run unattended.

  - Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

- **Excavation of potentially contaminated soil**

  - All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

  - Stop logs or barricades will be used when vehicles or mobile equipment are being used adjacent to an excavation.

- All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.

- Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.

- All self-propelled construction equipment shall be equipped with a back-up alarm.

- Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 20 A:B:C.

- All underground utilities shall be located and marked prior to excavation operations. Excavation will progress slowly until the exact location is determined.

- IT Policy and Procedure HS307 "Excavation and Trenching" will be adhered to at all times.

• **Dewatering of excavation**

- Real-time air monitoring place.

- Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards.

- All site personnel will practice good personal hygiene by utilizing the decontamination facility on site.

- The work area will be demarcated.

- Noise levels above 85 DBA mandate hearing protection.

- Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.

- Personal Floatation Devices are required for personnel working at the retention ponds.

- Keep feet and hands clear of moving/suspended materials and equipment.

- Beware of contact points.

- Stay alert at all times!

- Use proper lifting techniques. Lifts greater than 60 pound require assistance or mechanical equipment. Size up the lift. Recommend wearing a back support if possible.

- Wear adequate hand protection.

- Hardhats, remove unsecured tools and materials before operating equipment.

- Stay clear of materials suspended overhead.

- Inspect the work area carefully and avoid placing hands and feet into concealed areas.

- Personnel working at heights of 6 feet or more must be secured with fall protection.

- Real-time air monitoring will take place to determine oxygen content and lower explosive limit.

- No smoking or open flames inside or EZ or CRZ.

- Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

- All hoses, couplings, fixtures, etc. shall be properly bonded and grounded.

- IT Corporation's HS314 "Hot Work in Hazardous Locations" Policy and Procedure shall be adhered to at all times.

- Electrical equipment will be locked out and tagged.

- Signal person will assist in positioning equipment.

- Inspections of determinations of road conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.

- Vehicles not meeting safe operating conditions shall be removed from service, repaired or replaced, and reinspected before being placed in service again.

- No vehicle shall be left unattended until after the motor has been shut off, the key removed, parking brake set, and gear engaged in low, and reverse, or park.

- Machinery or equipment will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded.

- Equipment shall be inspected before being placed into service and at the beginning of each shift.

- Preventive maintenance procedures recommended by the manufacturer shall be followed.

- A lockout-tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

- Machinery and mechanized equipment shall be operated only by designated personnel.

- All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

- All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.

- All self-propelled construction equipment shall be equipped with a back-up alarm.

- All on-site personnel shall be briefed on the safe work practices associated with vacuum truck operations.

- All containers shall be labeled as to contents and disposed of properly.

- Absorbent/neutralization material and 55-gallon drums will be kept available where leaks, spills, or ruptures may occur.

- Spilled materials shall be cleaned up immediately.

- Ladder safety will be discussed at the Morning Tailgate Safety Meeting.

- Ladders will be inspected prior to each use.

- Faulty ladders will be tagged and taken out of service.

- Ladders will be secured by top, bottom, and intermediate fastenings as required.

- Personnel working at heights of 6 feet or more must be secured with fall protection (safety belt lanyard).

- "Buddy System" - visual contact will be maintained with personnel engaged in the liquid transfer activities.

Chemical Hazards. Chemical hazards associated with the site excavation operation include acetone and toluene in the soils.

3.2.3 Task 3: Thermal Treatment of Contaminated Soil

IT's subcontractor will thermally treat contaminated soil.

Physical Hazards. The Physical Hazards involved in this task are related to the assembly, operation and maintenance of the LTTD unit itself.

- **Assembly of LTTD Unit**

  - Inspection of road conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment

  - Load over 60 pounds require assistance or mechanical lifting device

  - All hoisting equipment shall be capable of passing a performance test prior being placed into service

  - Taglines shall be used to control loads being handled by hoisting equipment

  - At no time shall the hoisting equipment be loaded in excess of the manufacturers rating except during performance tests

  - While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground

  - A "hot work" permit must be completed prior to any cutting or welding

  - Appropriate eye protection and garments must be used

  - Torches used for cutting must have an anti-flashback device

- Compressed gas cylinders must be properly stored and secured

- Noise levels above 85 dba mandates hearing protection

- Personnel working at heights of six feet or more must be secured with fall protection

- Ladders will be inspected prior to each use

- Ground fault circuit interrupters will be on all electrical tools and extension cords

- All confined space entries will comply to 29 CFR 1910.146 requirements

- A lockout/tagout procedure will be implemented that meets the 29 CFR 1910.147 requirements

- All propane lines shall be installed by a qualified person

- All propane lines shall be buried deep enough to prevent breaking

- Propane lines shall be demarcated to prevent accidental unearthing.

• **Operation of LTTD Unit**

- An emergency shutdown pull cord shall be installed in high maintenance areas or in any area where operators' hands or feet may become entangled in the machine

- Preventative maintenance procedures recommended by the manufacturer shall be followed

- A lockout/tagout procedure that meets the 29 CFR 1910.147 requirements must be used for equipment found to be faulty or undergoing maintenance

- Only qualified operators shall operate the LTTD Unit

- The LTTD Unit shall not be permitted to operate without a qualified operator

- Noise levels above 85 dba mandate hearing protection

- Good housekeeping shall be adhered to at all times to avoid slips, trips, and falls

- Ground fault circuit interrupters will be placed on all extension cords and electrical tools.

- **Maintenance of LTTD Unit**

  - A lockout/tagout procedure that meet the 29 CFR 1910.147 requirements must be used for equipment found to be faulty or under

  - All confined space entries will comply to 29 CFR 1910.146 requirements

  - All propane lines will be disconnected prior to any work being done on the kiln

  - Propane lines will be disconnected at the pilot line and the main burner line

  - "Hot work" permit must be complete prior to any cutting or welding

  - Personnel working at heights of 6 feet or more must be secured with fall protection

  - During propane tank refueling all motor vehicles shall remain 50 feet away from refueling truck.

Chemical Hazards. Inhalation of acetone and toluene from contact with contaminated soil poses a risk. Table 1 discusses chemical hazards.

3.2.4 Task 4: Confirmation Soil Sampling

IT will collect and analyze soil samples.

Physical Hazards. The physical hazards involved in this task are related to the handling of contaminated groundwater and soil.

Slip, trip, and fall hazards will be of concern during this task. Should the walking or working surfaces become wet, extra caution must be taken to avoid slipping.

Noise is not expected to be a hazard during this operation, but if noise levels exceed 85 dB, the use of hearing protection will be required.

Splash hazards will be present during the sampling of wells. Employees will be made aware of this hazard and handle all groundwater with appropriate care. Splash shields will be used by all employees engaged in this activity.

Employees will follow proper lifting techniques when sampling wells. No one will be permitted to lift over 60 pounds without getting assistance.

- **Moving and shipping collected samples**
  - Any lifting of 60 lbs or more requires assistance or a mechanical lifting device.
  - Follow safe lifting procedures.
  - Label all containers as to contents and associated hazards.
- **Staging equipment**
  - Area around monitoring will be barricaded/demarcated.
  - Equipment will be laid out in an area free of traffic flow.
  - Use care when handling any glassware.
  - Wear adequate hand protection.
- **Collect samples**
  - Sampling technicians will wear proper protective clothing equipment to safeguard against potential contamination.
  - Label all containers as to contents.
  - Review MSDSs for sample preservatives.
  - Use care when handling glassware.
  - Wear adequate hand protection.
  - Absorbent material and 55 gallon drums will be kept available where leaks, spills, or ruptures may occur.

- Spilled materials shall be cleaned up immediately.

- Noise levels above 85 dBA mandates hearing protection.

- Good housekeeping, keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip and fall hazards.

- Keep feet and hands clear of moving/suspended materials and equipment. Beware of contact points. Stay alert at all times!

- Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

- Know signs and symptoms. Follow procedures established in Sections 3.3 and 3.4 of the SSHP.

Chemical Hazards. Inhalation and ingestion of acetone and toluene from contact with contaminated soil poses a risk. Table 1 discusses chemical hazards.

3.2.5 Task 5: Backfilling of LARC Area

Physical Hazard.

- **Backfilling and site restoration**

  - Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition.

  - Equipment shall be inspected before being placed into service and at the beginning of each shift.

  - Preventive maintenance procedures recommended by the manufacturer shall be followed.

  - A lockout - tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

  - Machinery and mechanized equipment shall be operated only by designated personnel.

  - Getting off or on any equipment while it is in motion is prohibited.

- Machinery or equipment requiring an operator shall not be permitted to run unattended.

- Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

- All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

- All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair persons.

- Bulldozer and scraper blades, end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use.

- All self-propelled construction equipment shall be equipped with a back-up alarm.

- Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 B:C.

- IT Policy and Procedure HS307 "Excavation and Trenching" will be adhered to at all times.

- Dump truck bodies shall be fully lowered or blocked when maintenance is being performed or when not in use.

- Dump trucks will have back-up alarms.

- A signal person will be used when the point of operation is not in full view of the vehicle, machine or equipment operator; vehicles are backed more than 100 feet; terrain is hazardous; or 2 or more vehicles are backing in the same area.

- Ground personnel shall wear reflective vests.

- Noise levels above 85 dBA mandates the use of hearing protection.

Chemical Hazard. No chemical hazards expected during this task.

3.2.6 Task 6: Site Teardown

For hazards associated with site teardown, refer to Task 1 Mobilization/Demobilization.

3.3 Heat Stress Signs and Symptoms

Wearing PPE places site workers at considerable risk of heat stress. Heat stress effects range from transient heat fatigue to serious illness and death. Heat stress is caused by several interacting factors including environmental conditions, clothing, work load, and the individual characteristics of the worker. Because heat stress is the most common and potentially serious illness at hazardous waste sites, preventive measures and alertness to the signs and symptoms are vital.

Heat stress monitoring should begin when personnel are wearing PPE, including Tyvek coveralls, and the ambient temperature exceeds 70 degrees Fahrenheit (°F). If impermeable garments are not worn, heat stress monitoring should begin at 85°F. Permeable clothing monitoring shall be performed to the ACGIH, TLV heat stress protocol, using a WBGT. Impermeable (Tyvek) protective clothing requires the use of physiological monitoring, beginning at 70°F. When ambient temperatures exceed 85°F and impermeable garments are worn, physiological monitoring will be implemented.

Heat Rash. Heat rash is caused by continual exposure to heat and humid air, and is aggravated by chaffing clothes. Heat rash decreases a person's ability to tolerate heat as well as becoming an irritating nuisance.

Heat Cramps. Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

Heat Exhaustion. Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness

- Nausea
- Fainting.

Heat Stroke. Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occur. Competent medical help must be obtained immediately. This is a true medical emergency. Signs and symptoms are:

- Red, hot, usually dry skin
- Lack of or reduced perspiration
- Nausea
- Dizziness and confusion
- Strong, rapid pulse (initially)
- Coma.

3.4 Signs and Symptoms of Cold Stress

Most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures, or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is a drop in the deep-core body temperature.

Employees should be protected from exposure to cold so that their deep-core body temperature does not fall below 36 degrees Celsius (°C) (equivalent to 96.8°F). A lower body temperature will very likely result in reduced mental alertness, reduction in rational decision-making, or loss of consciousness with the threat of fatal consequences.

Frostbite. Frostbite occurs when the extremities do not get sufficient heat from the central body stores. The fluids around the cells of the body tissues freeze from exposure to low temperatures. This condition can result in damage to, and loss of, tissue. The most vulnerable areas are the nose, cheeks, ears, fingers, and toes.

Damage from frostbite can occur in either the outer layers of skin, or in the tissue beneath these layers, and can be serious resulting in scarring, tissue death, permanent loss of movement, or amputation.

There are three degrees of frostbite:

- First degree: freezing without blistering or peeling
- Second degree: freezing with blistering or peeling
- Third degree: freezing with skin tissue death and possible deeper tissue damage.

Symptoms of frostbite include:

- Skin color changes to white or grayish-yellow, to reddish-violet, and finally black as the tissue dies
- Pain may be felt at first, but subsides
- Coldness or numbness of the affected part.

Hypothermia. This is the most severe form of cold stress and results from a drop in the body's core temperature. The symptoms of hypothermia are:

- First, uncontrollable shivering and the sensation of cold
- Heartbeat slows and may become irregular
- Pulse weakens and the blood pressure changes
- As the body's core temperature drops, other signs may include cool skin, slow irregular breathing, and apparent exhaustion
- When core temperatures are in the mid-range, the victim may become listless, confused, exhibit severe shivering, or develop severe pain in the extremities
- Final signs are a significant drop in blood pressure, fatigue, and shallow respiration.

3.5 Hazardous and Toxic Materials

This section discusses the hazards associated with materials that are used on the site or are likely to be found on the site. The SHM will update this section as information developed during this project warrants. This section discusses the hazards associated with materials that are used on the site or are likely to be found on the site. The HSM will update this section as information developed during this project warrants. There are several chemical compounds that have the potential to exist or do exist in small concentrations in the LARC 60 area. Acetone and toluene are the more significant of these based on their concentration and

likelihood of exposure during anticipated site activities. Potential health effects of these site contaminants are provided in Table 1. MSDSs for these contaminants have been provided in Appendix B. Other contaminants have been detected in previous sampling events but at levels far below what would be needed to present a hazard to project personnel.

3.6 Exposure Standards

Threshold Limit Values (TLV) refer to airborne concentrations of substances which represent conditions that nearly all employees may be repeatedly exposed to day after day without adverse effect. These TLVs are prescribed by the American Conference of Governmental Industrial Hygienists (ACGIH) and are based upon the best available information obtained through industrial experience and animal or human studies. Because of the wide variation in individual susceptibility, a small percentage of workers may experience discomfort from some substances at concentrations below the recommended values. It has been policy to use these guidelines for good hygienic practices; however, whenever applicable, stricter guidelines may be utilized.

Exposures are based upon the time-weighted average (TWA) concentration for a normal 8-hour workday and a 40-hour work week. Several chemical substances have short-term exposure limits (STEL) or ceiling values which allow a maximum concentration to which workers can be exposed continuously for a short period of time without suffering from:

- Irritation
- Chronic or irreversible tissue damage
- Narcosis of a sufficient degree to result in accidental injury, impaired self-rescue abilities, or substantially reduced work efficiency.

The STEL is defined by the ACGIH as a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposure above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day. There should be at least 60 minutes between successive exposures in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects. OSHA requires that a 15-minute "Ceiling" concentration never be exceeded for that chemical constituent. This notation appears as the letter "C" after the chemical name.

Under certain chemical substance listings, a "skin" notation may appear. This refers to the potential contribution to the overall exposure by the cutaneous route, including mucous membranes and eye, either airborne or by direct contact. Little quantitative data is available describing absorption as a function of the concentration to which the skin is exposed. Biological monitoring may be considered to determine the relative contribution of dermal exposure to the total dose.

The ACGIH and OSHA have recognized through epidemiological studies, toxicology studies, and, to a lesser extent, case histories that certain chemical substances may have the potential to be carcinogenic in humans. Because of the long latency period for many carcinogens, it is often impossible to base timely risk management decisions on the results of such information. Two categories of carcinogens are designated based upon the most current literature and information. These include confirmed human carcinogens and suspected human carcinogens. These chemical categories are based on either:

- Limited epidemiologic evidence
- Demonstration of carcinogens in one or more animal species by appropriate methods.

The worker potentially exposed to a known human carcinogen must be properly equipped to ensure virtually no contact with the chemical constituents. In the case of a suspected human carcinogen, worker exposure by all routes must be carefully controlled by the use of personal and respiratory protection and through administrative or engineering controls.

3.7 Biological Hazards

Ticks. Ticks are vectors of many different diseases including: rocky mountain spotted fever, Q fever, tularemia, and lyme disease. They attach to their hosts' skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the work day, employees will inspect themselves for the presence of ticks, paying special attention to check areas where hair is present.

Poisonous Plants. Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a stem. Poison ivy is in the form of a vine, while oak and sumac are bush-like. All produce a delayed allergic hypersensitivity. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure, resulting in burning or stinging, and weeping and/or crusted blisters. Should exposure to any of these plants occur, wash the affected area with a mild soap and water, but do not scrub the area. The best antidote for poisonous plants is recognition and avoidance.

Snakes. The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt.

Flying Insects. Flying insects such as mosquitos, wasps, hornets, and bees may be encountered while site activities occur.

4.0 Standard Operating Safety Procedures, Engineering Controls, and Work Practices

The following work practices will be observed during all site activities.

4.1 General Practices

- At least one copy of this plan shall be available at the project site, in a location readily available to all personnel.
- Contaminated protective equipment, such as respirators, hoses, boots, etc., shall not be removed from the regulated area until it has been cleaned or properly packaged and labeled.
- Legible and understandable precautionary labels that comply with the hazard communication standard shall be affixed prominently to all containers of contaminated scrap, waste, debris, and clothing.
- Removal of contaminated soil from protective clothing or equipment by blowing, shaking, or any other means that disperse contaminants into the air is prohibited.
- No food or beverages shall be present or consumed in the regulated area.
- No tobacco products shall be present or used in the regulated area.
- Cosmetics shall not be applied within the regulated area.
- Contaminated materials shall be stored in tightly closed containers, in well-ventilated areas.
- Containers shall be moved only with the proper equipment, and shall be secured to prevent dropping or loss of control during transport.
- Emergency equipment shall be located outside storage areas in readily accessible locations that will remain minimally contaminated in an emergency.
- All areas that have been determined as uncontaminated inside the regulated area will be clearly marked as such. No personnel, equipment, etc., shall be in these areas until they have been decontaminated.
- Ensure that no one is required to lift more than 60 pounds.

- Any detected effects of toxic exposure shall be reported to the SS immediately.

- The wearing of contact lenses is not allowed in contamination zones.

- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury, splash, etc., must have approved eyewash units locally available.

- Enter work site upwind (as possible) from visible contamination; this area should be marked as an entrance by flagging.

- If any on-site activities, including decontamination, continue later than dusk, adequate lighting must be provided. Work areas must have adequate lighting for employees to see to work and identify hazards (5-foot candles minimum). Personnel should carry flashlights in all normally dark areas for use in the event of a power failure. Applicable OSHA standards for lighting, 29 CFR 1926.65 (m), shall apply. No work is to be conducted during storms.

- All electrical power must have a ground fault circuit interrupter (GFCI) as part of the circuit. All equipment must be suitable and approved for the class of hazard present. Applicable OSHA standards for electrical, 29 CFR 1926 Subpart "K", shall apply.

- The movement and opening of drums will be done in accordance with 29 CFR 1926.65 (j).

- Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Stay away from any waste drums if possible. Protect equipment from contamination by bagging it.

- Contamination (exclusion and decontamination) zones as established on the site shall be observed. Entry into the contamination zones shall be by prior notification and authorization of the SS. All required protective clothing shall be worn prior to entering contamination zones.

- Contaminated equipment and contaminated PPE, such as respirators, gloves, boots, etc. (if not discarded), shall not be removed from the contamination zones until they have been properly cleaned. Proper decontamination will be determined by the SS or a designate.

- Legible and understandable precautionary labels shall be affixed prominently to containers of contaminated scrap, waste, debris, and clothing.

- Contaminated materials shall be stored in tightly closed containers in well-ventilated areas.

- No food or beverages shall be present or used, and cosmetics shall not be applied in the contamination zones. They are only allowed in designated areas of the support zone.

- Beards, facial hair, or other facial obstructions that interfere with respirator fit will preclude admission to the exclusion zone (EZ) when respirators are required.

- Emergency equipment shall be located outside storage areas, in readily accessible locations, which will remain minimally contaminated.

- Employees shall inform their partners or fellow team members of nonvisible effects of overexposure to toxic materials. The symptoms of such overexposure may include:

  - Headaches
  - Dizziness
  - Nausea
  - Blurred vision
  - Cramps
  - Irritation of eyes, skin, or respiratory tract.

- Visitors to the site shall abide by the following:

  - All visitors shall be instructed to stay outside the contaminated zone (exclusion and decontamination zones) and remain within the clean zone during the extent of their stay. Visitors shall be cautioned to avoid skin contact with contaminated or suspected contaminated surfaces.

  - Visitors requesting to observe work conducted in the EZ must wear all appropriate PPE, prior to entry into that zone. If respiratory protective devices are necessary, visitors who wish to enter the contaminated zone must produce evidence that they have had a complete physical examination, training, and have been fit tested for a respirator within the past 12 months.

  - Visitor inspection of the contaminated area shall be at the discretion of the SS.

Buddy System. All on-site personnel shall use the buddy system. Personnel shall operate in teams, with each member of the team responsible for observing the other team members for:

- Signs and symptoms of chemical exposure
- Exposure to possible safety hazards
- Unsafe acts, or noncompliance with safety procedures.

No personnel will work on site if they are not within the line of sight of another team member.

4.2 Operation of Heavy Equipment

Heavy equipment can represent a substantial hazard to workers. In general, requirements for motor vehicles and material handling equipment are provided in OSHA Construction Industry Standards, 29 CFR 1926, Subpart O. The following safe working practices are to be followed when heavy equipment is in use (i.e., dozers, front-end/backhoe loaders):

- Use common sense. Do not assume that the equipment operator is keeping track of your whereabouts.

- Hard hats, steel-toed and shank boots, and safety glasses are to be worn at all times around heavy equipment. Other protective gear as specified int his H&S plan (including hearing protection) is also applicable.

- Remain alert at all times.

- Maintain visual contact at all times.

- Establish hand signal communication when verbal communication is difficult. Determine one person per work group to give hand signals to equipment operators.

- Be aware of footing at all times.

- Only qualified/licensed people are to operate heavy equipment.

- Use chains, hoists, straps,a nd any other equipment to safely aid in moving heavy materials.

- Use proper personal lifting techniques. Use your legs, not your back.

- never walk directly in back of, or to the side of, heavy equipment without the operator's knowledge.

- Never use a piece of equipment unless you are familiar with its operation.

- Be sure that no underground or overhead power lines, sewer lines, gas lines, or telephone lines will present a hazard in the work area.

- Keep all nonessential personnel out of the work area.

- Prohibit loose-fitting clothing or loose long hair around moving machinery.

- Keep cabs free of all nonessential items and secure all loose items.

- Instruct equipment operators to report to their supervisor(s) any abnormalities such as equipment failure, oozing liquids, unusual odors, etc.

- When an equipment operator must negotiate in tight quarters, provide a second person to ensure adequate clearance.

- Implement an ongoing maintenance program for all tools and equipment. Inspect all tools and moving equipment regularly to ensure that parts are secured and intact with no evidence of cracks or areas of weakness, that the equipment turns smoothly with no evidence of wobble, and that it is operating according to manufacturer's specifications. Promptly repair or replace any defective items. Keep maintenance and repair logs.

- Store tools in clean, secure areas so that they will not be damaged, lost, or stolen.

4.2.1 Equipment Decontamination

- All sampling equipment coming into direct contact with soil samples shall be decontaminated between samples.

- All other drilling equipment shall be decontaminated between drilling locations.

- All drilling equipment shall be decontaminated prior to the initiation of drilling activities and after completion of drilling operations before leaving the site.

4.3 Fall Protection

The walking and working surfaces may become wet and slippery during these tasks. Use extra caution when working on these surfaces. In addition, visible barriers will be erected around any open excavations or trenches to prevent personnel from falling into these areas. Any person working more than 4 feet off the ground must use the appropriate fall protection.

4.4 Project Specific Practices

To prevent personnel exposure to heat stress during all tasks, the practices outlined in Section 4.5.1 will be followed.

The work area must be marked in such a way as to prevent traffic from passing within 10 feet of the work area. Cones, caution tape, barricades, or other means must be used to define the work area.

All on-site personnel must wear steel-toed safety shoes, hard hats, and safety glasses. Long pants or trousers and shirts covering the upper body and upper arms must also be worn.

4.5 Heat Stress Prevention

4.5.1 Heat Stress

One or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure immediately prior to rest period) in excess of 110 beats per minute:

- Site workers will be encouraged to drink plenty of water throughout the day. They will be advised to slightly increase their salt intake by lightly salting their food.
- On-site drinking water will be kept cool (50 to 60°F) to encourage personnel to drink frequently.
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.

- Cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat.

- Employees should be instructed to monitor themselves and coworkers for signs of heat stress and to take additional breaks as necessary.

- A shaded rest area must be provided. All breaks should take place in the shaded rest area.

- Employees shall not be assigned to other tasks during breaks.

- Employees shall remove impermeable garments during rest periods. This includes white Tyvek-type garments.

- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

The signs of heat stress disorders are given below.

Heat Cramps. Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

Heat Exhaustion. Heat exhaustion occurs from increased stress on various body organs. Signs and symptoms include:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness, nausea
- Fainting.

Heat Stroke. Heat stroke is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Signs and symptoms of heat stroke include:

- Red, hot, usually dry skin
- Lack of, or reduced perspiration
- Nausea
- Dizziness and confusion

- Strong, rapid pulse and confusion
- Coma.

4.6 Hearing Conservation

All on-site IT and subcontractor personnel shall wear hearing protection, with a Noise Reduction Rating (NRR) of at least 20, when noise levels exceed 85 dB. All site personnel who may be exposed to noise shall also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Chapter 8.0.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, wherever possible, barriers or increased distance will be used to minimize worker exposure to noise.

4.7 Excavation Safety

Postexcavation sampling is often a project requirement. When it is necessary to do excavation, IT Procedure HS307 for excavation and trenching must be followed. Any excavation greater than 4 feet deep into which persons will enter to collect samples must be tested before entry. An excavation greater than 5 feet deep must be shored, sloped, or otherwise made safe for entry. The shoring or sloping system must be designed by a registered Professional Engineer (P.E.) licensed in the state in which the excavation will take place, as required. The design must be present at the site, and the system must be installed as designed.

All excavation shall be performed from a stable ground position. Daily inspections of the excavation shall be made by a competent person, one who has received training in excavation safety. The inspector shall determine the likelihood of a cave-in, and remedial action (RA) such as sloping or shoring shall be taken if the walls appear to be unstable.

All spoil shall be located at least 2 feet from the edge of the excavation to prevent it from falling back into the excavation. The excavation shall be guarded on all sides by barricades or caution tape at least 2 feet from the edge.

All project personnel shall participate in the daily Tailgate Safety Meetings and be instructed on the following requirements:

- Before excavating, the existence and location of underground pipe, electrical equipment, and gas lines will be determined. This will be done, if possible, by contacting the appropriate utility company and/or client representative to mark the location of the lines. If the client's knowledge of the area is incomplete, an appropriate device, such as a cable avoiding tool, will be used to locate the service line.

- No ignition sources are permitted if the ambient airborne concentration of flammable vapors exceeds 10 percent of the LEL during the excavation. A combustible gas indicator will be used to make this determination.

- Operations must be suspended and the area vented if the airborne flammable concentration reaches 10 percent of the LEL in the area of an ignition source (i.e., sparks from bucket of excavator).

- Combustible gas reading of the general work area will be made regularly.

- If excavating equipment is located in the vicinity of overhead power lines, a distance of 10 feet must be maintained between the lines and any point on the equipment. If the lines have appreciable sag, or if windy conditions exist, this distance shall be 20 feet.

4.8 Sanitation

A break area will be designated and provided in an area in the support zone (outside of contamination zones). Outdoor and indoor areas, such as trailers, may be designated. The designated areas will be clean and will facilitate the number of workers using it. Eating, drinking, and tobacco may be permitted in break areas.

IT will provide an adequate supply of drinking water. These drinks will be dispensed in an approved potable water system and in a manner which prevents contamination between the consumer and dispenser. All outlets dispensing nonpotable water will be posted "Caution - Water Unfit for Drinking, Washing, or Cooking." All containers used for storing and dispensing drinking water must be clearly marked and not used for any other purposes. A waste receptacle will be provided for used paper cups. Systems furnishing nonpotable water and systems furnishing potable water will be constructed and remain completely independent of each other.

IT will provide a chemical toilet for the personnel on site (USACE "Safety and Health Requirements Manual," Section 02.B). Arrangements will be made for the routine servicing and cleaning of this unit. Water and cleaning compounds will be made available for decontamination, washing face and hands, and sanitation purposes.

4.8.1 Potable Water

The following rules apply for all project field operations:

- An adequate supply of potable water will be provided at each work site.
- Portable containers used to dispense drinking water shall be capable of being tightly closed, and shall be equipped with a tap dispenser. Water shall not be drunk directly from the container.
- Containers used for drinking water shall be clearly marked and not used for any other purpose.
- Disposable cups will be supplied; both a sanitary container for unused cups and a receptacle for disposing of used cups shall be provided.

4.8.2 Nonpotable Water

Outlets for nonpotable water shall be identified to clearly indicate that the water is unsafe and is not to be used for drinking, washing, or cooking purposes. There shall be no cross connection (open or potential) between potable and nonpotable water systems. Nonpotable and potable water systems shall be separated so as to minimize confusion and possible cross contamination.

4.8.3 Trash Collection

Trash collected from the contamination reduction zone (CRZ) will be separated as routine hazardous waste. Trash collected in the support and break areas will be disposed of as nonhazardous waste. Labeled trash receptacles will be set up in the CRZ and in the support zone.

5.0 Personal Protective Equipment

Respiratory protective equipment shall be NIOSH-approved and respirator use shall conform to American National Standards Institute (ANSI) Z88.2 and OSHA 29 CFR 1926.103 requirements. Each employer shall maintain a written respiratory protection program detailing selection, use, inspection, cleaning, maintenance, storage, and fit testing of respiratory protective equipment.

All personnel (including visitors) performing on-site activities, and using a negative pressure respirator must have successfully passed a qualitative respirator fit test in accordance with OSHA 29 CFR 1926.132 within the last 12 months. Documentation of fit testing is the responsibility of each employer. Fit testing and any training related to respiratory protection for IT personnel will be documented on the IT Respiratory Training Completion Form.

The PPE outlined below has been selected according to the site characterization and analysis, job tasks, site hazards, intended use, and duration of potential employee exposures. Maintenance and storage of PPE, decontamination, donning and doffing procedures, inspection and monitoring of effectiveness, and limitation are outlined in this section. Refer to Table 2 for PPE Selection Matrix.

5.1 Respiratory Protection Program

The site respiratory protection program will consist of the following:

- All site personnel will have an assigned respirator.
- All site personnel must be fit tested and qualified in the use of an air-purifying respirator (APR) within the past 12 months. Fit test and respirator qualification cards must provided to the SS prior to commencing site work.
- All site personnel must, within the past year, have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the SS prior to commencement of site work.
- Only properly cleaned, maintained, NIOSH-approved respirators are to be used on this site.

- If respirators are used, the respirator cartridge is to be disposed of at the end of each work shift, or when load-up or breakthrough occurs.

- Contact lenses are not to be worn when a respirator is worn.

- All site personnel will be clean shaven. Mustaches and side burns are permitted, but they must not touch the sealing surface of the respirator.

- Respirators will be inspected, and a positive, negative pressure test performed prior to each use.

- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag.

5.2 Levels of Protection

The following is a brief description of the PPE which may be required during various phases of the project. The EPA terminology for protective equipment will be used; Levels A, B, C and D. At a minimum, four sets of appropriate PPE will be maintained at the site for visitor usage.

5.2.1 Level C Protection

Level C protection is not expected to be recovered. Level C protection will be required if airborne concentrations of toxic concentrations of toxic contaminants exceed the action levels established in Table 3-1.

Level C protective equipment at a minimum shall consist of:

- Polyethylene coated Tyvek, taped at gloves and boot covers

- Chemical resistant boot covers (rubber or equivalent) worn over steel-toed work boots or chemical resistant steel-toed work boots

- Chemical resistant inner gloves (disposable)

- Chemical resistant outer gloves (nitrile or equivalent)

- Full-face APR with organic vapor/acid gas high-efficiency particulate air (HEPA) combination cartridges

- Hard hat
- Ankles/wrists taped with duct tape.

5.2.2 Level D Protection

Level D protection shall be used when:

- The atmosphere contains no known hazard
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations or harmful chemicals
- Atmospheric concentrations of contaminants are less than the TLV.

Level D - modified protective equipment at a minimum shall consist of:

- Tyvek with hoods and elastic wrists and ankles
- Laytex gloves (outer)
- Nitrile gloves (outer)
- Steel toed neoprene boots
- Safety glasses
- Hard hat
- Hearing protection (if necessary)

Level D protective equipment at a minimum shall consist of:

- Standard work uniforms or coveralls
- Steel-toes work boots
- Gloves as needed
- Safety glasses as needed
- Splash shield as needed
- Hard hat.

5.3 Using Personal Protective Equipment

Depending upon the level of protection selected for this project, specific donning and doffing procedures may or may not be required. The following procedures are mandatory if Level C or higher PPE is selected.

All persons entering the EZ shall put on the required PPE in accordance with the requirements of this plan. When leaving the EZ, PPE will be removed in accordance with the procedures listed, in order to minimize the spread of contamination.

5.3.1 Donning Procedures

These procedures are mandatory, only if Level C or higher PPE is required for the project:

- Remove bulky outerwear. Remove street clothes and store in clean location.
- Put on disposable or IT-issue (and laundered) work clothes or coveralls.
- Put on the required chemical protective coveralls or rain gear.
- Put on chemical protective boots or boot covers.
- Tape the legs of the coveralls to the boots with duct tape.
- Put on chemical protective gloves as required by the SSHP.
- Tape the wrists of the protective coveralls to the gloves.
- Don respirator if required, and perform appropriate fit check.
- Put hood or head covering over head and respirator straps. Tape the hood to the face of the respirator.
- Don remaining PPE, such as safety glasses or goggles and hard hat.

If these procedures are instituted, one person shall remain outside the work area to ensure that each person entering has the proper protective equipment. No persons shall be allowed to enter an EZ if they are not wearing the required PPE.

5.3.2 Doffing Procedures

The following procedures are only mandatory if Level C or higher PPE is required for this project. Whenever a person leaves a Level C or higher work site, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers.

- Clean reusable protective equipment.
- Remove protective garments, equipment, and respirator. All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels.
- Wash face and neck.
- Proceed to clean area and dress in clean clothing.
- Clean and disinfect respirator for next use.
- Proceed to the sign-out point.

All disposable equipment, garments, and PPE shall be bagged in two 6 mil plastic bags, properly labeled for disposal.

5.4 Selection Matrix

The level of personal protection selected will be based upon real-time air monitoring of the work environment and an assessment by the SS of the potential for skin contact with contaminated materials. The PPE Selection Matrix is given in Table 2.

6.0 Site Control Measures

The primary purpose for contamination control zones is to establish the hazardous area perimeter, to reduce migration of contaminants into clean areas, and to prevent access or exposure to hazardous conditions by unauthorized persons. At the end of each workday, the entire site should be secured or guarded to prevent unauthorized entry. Site work zones will include a SZ, CRZ, and EZ.

6.1 Support Zone

The uncontaminated SZ, or clean zone, will be the area outside the EZ and CRZ and within the geographic perimeters of the site. The area is used for staging of materials, parking of vehicles, office facilities, sanitation facilities, and receipt of deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, etc., who will not necessarily be permitted in the EZ. All personnel arriving in the SZ will, upon arrival, report to the site office and sign the site visitor log.

6.2 Contamination Reduction Zone

Personnel and equipment decontamination will be performed in the CRZ that is adjacent to the EZ. All personnel entering or leaving the EZ will pass through this area in order to prevent any cross-contamination and for the purpose of accountability. Personal protective outer garments and respiratory protection will be removed in the CRZ and properly labeled. All water generated from equipment and personal decontamination will be contained on site and disposed of in an appropriate manner.

6.3 Exclusion Zone

The EZ is the area where contamination does or could occur during site activities. This zone has the highest potential for exposure to contamination by contact, ingestion, or inhalation. All employees will use proper PPE when working in these areas. The location of the EZ will be identified by fencing or other appropriate means. An entry log is kept daily which records the time of entry and exit from the EZ for each person.

6.4 Emergency Entry and Exit

Contamination control zones, evacuation routes, and emergency equipment locations will be included on a site map prior to the initiation of on-site activities. During an emergency, the

evacuation routes noted on the site map should be followed. If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, evacuate by the safest means available and decontaminate to the greatest extent possible. Additional emergency procedures can be found in Section 11.0.

6.5 Site Entry Requirements

In order to allow an individual into potentially contaminated areas of the site (CRZ and EZ), he/she must meet the following requirements:

- Documentation of completing training requirements as described in Section 9.0 (including review of this SOSP and signing off as such)
- Documentation of completing medical surveillance requirements as described in Section 10.0
- Respiratory fit testing as necessary (Section 5.1)
- A hazard briefing which includes current operations at the site, hazards that exist, and control measures to follow
- Signing the site entry log.

6.6 Posting Site

Appropriate warning signs will be strategically placed where people enter the EZ and CRZ. Signs should read "DANGER-AUTHORIZED PERSONNEL ONLY, PERSONAL PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT" or similar. Signs may be more hazard specific as necessary. Additional signs may be posted at the perimeter of the site to alert passersby of potential dangers.

7.0 Decontamination

In general, everything that enters an EZ at this site must either be decontaminated or properly discarded upon exit from an EZ. All personnel must enter and exit an EZ through a CRZ. Prior to movement from an EZ, contaminated equipment will be decontaminated and inspected by the SSHO before it is moved into the SZ. This inspection shall be noted in the daily log.

7.1 Procedures for Equipment Decontamination

Any item or vehicle taken into an EZ must be assumed to be contaminated and must be carefully inspected and/or decontaminated prior to leaving that particular EZ. A visual inspection of the frame and tires of all vehicles and equipment leaving an EZ will be completed. In order for a vehicle/equipment to pass inspection, it must be in a broom-clean condition, water washed, and free of loose dirt or sludge material on tailgates, axles, wheels, bucket, etc.

The equipment decontamination area will be used to remove soil from all equipment leaving the work area. Decontamination procedures will consist of washing equipment to remove mud and/or dirt. A special "clean area" will be utilized by personnel who must come in contact with equipment during vehicle maintenance and repair. All equipment requiring maintenance or repair will be staged in a CRZ prior to servicing.

Personnel assigned to vehicle decontamination will wear the protective equipment, clothing, and respiratory protection consistent with this SOSP. Seats and flooring in equipment and vehicles that are to be used in the EZ will be covered to the greatest extent possible with disposable polyethylene.

7.2 Personnel Decontamination

Personnel decontamination facilities will be established by IT on site to ensure that personnel maintain a high degree of personal hygiene and minimize the possibility of exposure to chemical hazards. These personnel hygiene facilities will conform to the requirements specified in 20 CFR 1926.65. A personnel decontamination area will be established immediately outside the EZ in the CRZ to facilitate contamination and PPE removal. All

personnel exiting the EZ will pass through the decontamination area to remove gross contamination. Standard IT decontamination procedures are as follows.

Decontamination Procedures Level D-Modified

- Step into first wash tub and wash neoprene boots with soap solution and scrub brush.
- Step into second wash tub and rinse boots with clean water and scrub brush.
- Remove outer nitrile gloves and dispose in the proper receptacle.
- Remove outer regular Tyvek coveralls and dispose in the proper receptacle.
- Remove neoprene boots and place in boot rack.
- Remove latex gloves and dispose in the proper receptacle.
- Wash hands and face before eating, drinking, or smoking (break).
- Remove underclothing and socks (end of shift).
- Proceed to shower (end of shift).
- Redress in street clothes/leave site.

Decontamination Procedures Level C/Level B

- Step into first wash tub and wash neoprene boots with soap solution and scrub brush.
- Step into second wash tub, rinse boots with clean water, and scrub brush.
- Untape boots, gloves, and respirator.
- Remove outer nitrile gloves and dispose in the proper receptacle.
- If in Level B, remove belt and regulator so polyethylene coated Tyvek suit can be removed.
- Remove Tyvek coveralls and dispose in the proper receptacle.

- Remove neoprene boots and place in the boot rack.
- Remove respirator, if applicable, and place on hanger if on break, or on the table at the end of the shift.
- Remove latex/nitrile gloves and dispose in the proper receptacle.
- Wash hands and face before eating, drinking, or smoking (break).
- Remove underclothing and socks (end of shift).
- Proceed to shower (end of shift).
- Redress in street clothes/leave site.

Personnel are required to shower completely (including the washing of hair) prior to changing into street clothes at the end of their work shift, and prior to leaving the site. Personnel are required to wash hands, face, and other exposed skin areas prior to leaving the CRZ for breaks or lunch. Towels, washcloths, soap, and shampoo will be provided to personnel. Work clothes will be left in the shower/change facility. With the exception of work within the SZ, no work clothing, shoes, or boots will be worn off or carried out of the project area. Soiled work clothes will be laundered on site. Inner protective clothing and towels will be laundered utilizing soap and chlorine bleach. Boots, gloves, and respirators will be decontaminated prior to entering the support zone.

8.0 Site Monitoring

8.1 Air Monitoring

The plan addresses exposures to operations personnel, Roth Brothers employees, and the surrounding community. A personnel sampling program to determine exposures to field personnel will be instituted using personal sampling methods. Ambient monitoring stations will be utilized to collect data on fugitive dust generated by site operations. Stations will be set up upwind and downwind of the operations. In addition, a station will be deployed at a point on the site nearest the neighborhood next to the site.

Air monitoring will be conducted at each investigation site to determine employee exposure to airborne contaminants.

Real-time air monitoring will be performed for total airborne particulates using a miniram aerosol monitor. Air monitoring results will be used to determine the effectiveness and/or need for dust control methods.

Measurements of airborne volatile organic compounds (VOC) will be conducted in the work area by using an HNu photoionization analyzer with an 11.7-electron volt (ev) lamp. VOCs will be monitored in the breathing zones of employees.

Combustible gas readings shall be conducted in the areas of sampling or excavating if flammable contaminants are anticipated.

8.1.1 Locations to be Monitored

All personal integrated air monitoring samples and direct reading instrumentation readings taken for the purpose of determining appropriate H&S precautions shall be collected/taken in the approximate "breathing zone". The SSO will be responsible for selecting appropriate individuals anticipated to be at highest risk for potential inhalation of airborne contaminants (i.e., readings should be taken at the approximate head-height closest to the sample location or other suspected source of contamination).

If entry into a confined space is deemed necessary (Section 4.2), combustible gas, oxygen, and total organics readings will be collected and recorded from the top, middle, and bottom of

the excavation prior to initial entry. Once the IT qualified person and/or SSO has reviewed this information, determined the PPE necessary for entry, and the entry has been initiated, all readings shall be taken in the approximate "breathing zone" of the IT employee(s) working within the confined space.

8.1.2 Frequency

Continuous or intermittent area monitoring may be chosen for this project. The monitoring equipment will be positioned at approximately "breathing zone" height to estimate personnel exposure. Readings shall be recorded at least every hour on the IT real-time air monitoring log.

Action levels for the various instruments are specified in Table 3-1. The frequency and location of air monitoring are specified in Table 3-2.

8.1.3 Air Monitoring Equipment

The following equipment will be available for on-site utilization as required:

- HNu photoionization analyzer with an 11.7 ev lamp.
- Miniram
- Combination oxygen/combustible gas monitor.

All equipment shall be maintained in such quantity and condition to adequately monitor and assess all site operations.

8.1.4 Monitoring Equipment Maintenance and Calibration

All IT test equipment will be calibrated in accordance with IT Procedure HS603. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturers' procedures.

All other IT monitoring equipment (e.g., combustible gas/oxygen meters and aerosol monitors) will be maintained and calibrated in accordance with the specific manufacturers' procedures.

All direct reading instrumentation calibrations should be conducted under the approximate environmental conditions the instrument will be used. All air monitoring equipment calibrations and maintenance activities shall be documented on the IT FADL, or equivalent. All completed H&S documentation/forms shall be reviewed by the Project H&S Manager and maintained by the Site Supervisor.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the IT SSO shall be responsible for immediately removing the instrument from service and obtaining a replacement unit. The specific IT or subcontractor operation for which this equipment is essential shall cease until an appropriate replacement unit is obtained. The SSO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

8.2 Noise Monitoring

Noise monitoring is not anticipated on this project, however it may be performed if noise levels in the speech-interfering level are encountered.

8.3 Heat Stress

Heat stress monitoring shall be initiated whenever ambient temperatures on site exceed 85°F. At the discretion of the SSO, environmental and/or physiologic monitoring will be carried out. Monitoring and interpretation of monitoring results will be in accordance with IT Procedure HS400, "Working in Hot Environments," and Section 4.0 of this plan.

8.4 Safety Review

At least once during the project, both the Project Manager and an H&S professional will carry out a comprehensive safety review of the project. The Site Supervisor will conduct frequent site safety inspections (no less than once per week). Management safety reviews will be recorded on Safety Inspection Report Forms and will be forwarded to the responsible business unit management for review. The Site Supervisor will record the inspection results on the Safety Inspection Report.

8.5 Monitoring Records

The Project Manager shall ensure that site monitoring records are complete and incorporated into the project file. Any personnel or area air monitoring results will be incorporated into

the host office H&S files. The SSO and the host office H&S Coordinator will be responsible for establishing, maintaining, and forwarding to other IT offices (as necessary) all required personal monitoring information as described below for inclusion in individual employee files:

- Employee name, social security number, payroll number
- The date, time, pertinent task information, exposure information
- Description of the analytical methods, equipment used, and calibration data
- Type of PPE worn
- Engineering controls used to reduce exposure.

9.0 Employee Training

9.1 General

The SS or a designated representative will be responsible for informing all personnel performing on-site activities and all visitors of the contents of this plan and ensuring that each person signs the SSHP Acknowledgement Form. By signing the SSHP Acknowledgement Form, individuals are recognizing the hazards present on site and the policies and procedures required to minimize exposure to hazards or adverse effects caused by hazards.

All on-site project personnel shall have completed at least 40 hours of hazardous waste operations-related training, as required by OSHA 29 CFR 1926.65. All field employees receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Those personnel who completed the 40-hour training more than 12 months prior to the start of the project shall have completed an 8-hour refresher course within the past 12 months. The SS shall have completed an additional 8 hours of relevant H&S training and shall have a current first-aid/CPR certificate. Subcontractor personnel must meet the above training requirements.

IT provides each employee who completes the required 40 hours of classroom training and 3 days of field experience with a certificate signed by the instructor. A copy of the certificate is maintained in the employee's home business unit training files. Subcontractors must provide certificates of training for the project file for all employees assigned to the project.

9.1.1 Tailgate Safety Meetings

Prior to the start of the project, all personnel will participate in a Tailgate Safety Meeting. During the Tailgate Safety Meeting, the SSHP will be discussed. The SS will ensure that the anticipated site hazards are summarized and explained to all personnel, and that those personnel are aware of the precautions they must take to minimize their exposure to those hazards. Tailgate Safety Meetings will be held at the start of each work shift. All new employees must attend the meeting and be familiar with this SSHP.

Attendance records and meeting notes are maintained with the project files.

9.1.2 Material Safety Data Sheets

The SSHP includes MSDSs and occupational health guidelines for chemical substances known to be on site (Appendix B). The SSHP is maintained on site and is accessible to all site employees. Each employee is required to review and sign the SSHP before starting work on the site.

9.1.3 Site-Specific SSHP

The IT safety department prepares a site-specific SSHP for each project falling within the scope and application of OSHA 29 CFR 1926.65 and IT Procedure HS052. The SS presents the SSHP and discusses it with all personnel assigned to the project. All workers and visitors must read and sign the SSHP, acknowledging acceptance of site rules and understanding of site hazards before the start of the site work.

9.2 Site Workers' Basic Course

The following is a list of the topics covered in IT's 40-hour training course:

- General site safety
- Physical hazards (fall protection, noise, heat stress, cold stress)
- Names and titles of key personnel responsible for site H&S
- Safety, health, and other hazards typically present at hazardous waste sites
- Use of PPE
- Work practices by which employees can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards
- Worker right-to-know (Hazard Communication OSHA 1926.59)
- Routes of exposure to contaminants
- Engineering controls and safe work practices
- Components of the site H&S program

- Decontamination practices for personnel and equipment
- Confined-space entry procedures
- Emergency response plan.

9.3 Supervisors' Course Content

Management and supervisors must receive an additional eight hours of training presented by the IT Training Department that includes:

- General site safety and health programs
- PPE programs
- Air monitoring techniques.

9.4 Site-Specific Training

Site-specific training will be accomplished through a review of this SSHP and the daily Tailgate Safety Meetings.

9.5 First Aid and Cardiopulmonary Resuscitation

At least two employees current in first aid/CPR will be assigned to the work crew and will be on the site whenever drilling operations are ongoing. First-aid and CPR training courses are offered to all IT employees. Annual refresher training in first aid and CPR is required to maintain the currency of the certificate.

9.6 Instructors

The IT Training Department, headquartered in Irvine, California, teaches the 40-hour hazardous waste operations classes using Certified Environmental Trainers (CET). When training needs exceed the capacity of the training division, IT uses outside institutions. IT is recognized by the EPA and listed in the Federal Register (FR) (53 FR 3982). Only similarly recognized outside training institutions may be used with prior approval of the IT Training Department.

10.0 Medical Surveillance

10.1 Medical Examination

All on-site project personnel shall have completed a comprehensive medical examination within the past 12 months that meets the requirements of OSHA 29 CFR 1926.65 and IT Procedures HS100 and HS101. The annual medical includes the following elements:

- Medical and occupational history questionnaire
- Physical examination
- Complete blood count, with differential
- Liver enzyme profile
- Chest X-ray, once every three years, for nonasbestos workers
- Pulmonary function test
- Audiogram
- Electrocardiogram for persons older than 35 years of age, or if indicated during the physical examination
- Illegal drug screening
- Visual acuity
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

All employee medical records are maintained by the H&S staff within the worker's home profit center, or for subcontractors at the subcontractor's office. The examining physician provides the employee with a letter summarizing his findings and recommendations. Each employee also has the right to inspect and copy his medical records.

The examining physician provides the employer with a letter confirming the worker's fitness for work and ability to wear a respirator. A copy of this letter for all project workers will be kept on site during all project site work.

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician on the Certification Form (Appendix A). The physical examinations shall meet the requirements of OSHA 29 CFR 1926.65, 29 CFR 1926.103, and IT procedures. Subcontractors will supply copies of the medical examination certificate for each on-site employee.

10.1.1 Placement Examination

All employees will receive a placement medical examination prior to assignment to field operations.

10.1.2 Annual Examination

Each year, subsequent to the placement examination, all employees and subcontractors must undergo an annual examination, similar in scope to the placement examination. Chest X-rays are taken every third year. The medical and occupational history is updated with each examination.

10.1.3 Exit Examination

IT employees receive an exit examination upon leaving the company if they have not been examined within the previous six months. The exit examination consists of the annual examination without drug screen. The employee's immediate supervisor is to notify the home office H&S staff within a reasonable time before the termination to allow for the necessary arrangements.

10.2 First Aid and Medical Treatment

All persons on site must report any near-miss incident, accident, injury, or illness to their immediate supervisor or the SS. First aid will be provided by the designated site first aider. Injuries and illnesses requiring medical treatment will be accompanied by an "Authorization for Treatment Form." The employee's supervisor or the SS will complete the "Supervisor's Employee Injury Report" and conduct an accident investigation as soon as emergency conditions no longer exist and first-aid and/or medical treatment has been ensured. The investigation should follow the Accident/Injury Investigation Report. These two reports must be completed and submitted to the SHM within 24 hours after the incident.

If first-aid treatment is required, first-aid kits are kept at the CRZ and in all IT vehicles. If treatment beyond first aid is required, the injured should be transported to the medical facility as shown in Appendix C. If the injured is not ambulatory, or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

10.3 Medical Restriction

When a medical care provider identifies a need to restrict work activity, the employee's home office H&S staff will communicate the restriction to the employee, their supervisor, and the office H&S professional. The terms of the restriction will be discussed with the employee and this supervisor. Every attempt will be made to keep the employee working, while not violating the terms of the medical restriction.

10.4 Medical Records

Medical and personal exposure monitoring records will be maintained according to the requirements of OSHA 29 CFR 1926.33 and shall be kept for 30 years postemployment. Employee confidentiality shall be maintained. Employees and their authorized representatives have access to these records through the H&S staff.

11.0 Emergency Procedures

This SSHP has been developed to allow all operations to be conducted without adverse impact to the H&S of project personnel, other personnel, and the environment. Supplementary procedures are included in this section to address extraordinary conditions that might occur at the site.

11.1 General

The SS will establish evacuation routes and assembly areas for each site. All personnel entering the site will be informed of these routes and assembly areas. If the site is large and the evacuation routes not clear, a site plan will be made marking the evacuation routes and will be posted at conspicuous locations.

Each site will be evaluated for the potential for fire, explosion, chemical release, or other catastrophic events. Unusual events, activities, chemicals, and conditions will be reported to the SS.

11.2 Emergency Procedures

If an incident occurs, the following procedures will be used:

- The SS will evaluate the incident and assess the need for assistance
- The SS will call for outside assistance as needed
- The SS will act as liaison between outside agencies and on-site personnel
- The SS will ensure the PM and an SSHO at the nearest IT office are notified promptly of any incident
- The SS will take appropriate measures to stabilize the incident scene.

11.3 Safety Signals

Vehicle or portable air horns will be used for safety signals as follows:

- One long blast: Emergency evacuation of the site
- Two short blasts: Clear working area around powered or moving equipment.

11.4 Medical Emergency

All employee injuries must be promptly reported to the SS. The SS will:

- Ensure that the injured employee receives prompt first aid and medical attention
- Ensure that the PM and General Manager are promptly notified of the incident
- Initiate an investigation of the incident.

11.4.1 Chemical Inhalation

Any employee complaining of symptoms of chemical overexposure as described in Table 1 will be removed from the work area and transported to the designated medical facility for examination and treatment. It is highly unlikely that the chemicals anticipated as being on site, in the concentrations anticipated, would cause situations immediately dangerous to life and health.

11.4.2 Eye Contact

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the contaminated zone, shall immediately proceed to the eyewash station, set up in the decontamination zone. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

11.4.3 Skin Contact

Project personnel who have had skin contact with contaminants will, unless the contact is severe, proceed through the decontamination zone, to the wash-up area. Personnel will remove any contaminated clothing, and then wash the affected area with water for at least 15 minutes. The worker should be transported to the medical facility listed below if they show any sign of skin reddening, irritation, or if they request a medical examination.

11.4.4 Personal Injury Accident

In the event of a personal injury accident, the SS will assess the nature and seriousness of the injury. In the case of serious or life-threatening injuries, normal decontamination procedures may be ignored. Less serious injuries such as strains, sprains, minor cuts, and contusions may only be treated after the employee has been decontaminated. Refer to Appendix C, Site and Hospital Location Maps.

Following decontamination, an IT project team member qualified in first aid and CPR will administer suitable first aid. The SS will then, if necessary, arrange transport to the appropriate medical facility.

11.5 Fire or Explosions

In the event of a fire greater than incipient stage or explosion, the local fire department should be summoned immediately. Upon their arrival, the SS or designated alternative will advise the fire commander of the location, nature, and identification of hazardous materials on site.

If it is safe to do so, site personnel may:

- Use fire fighting equipment on site
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

11.6 Spills or Leaks

In the event of a spill or leak, site personnel will:

- Notify the local fire department and any other necessary authorities if a reportable quantity is released.
- Locate or isolate flammable or other hazardous materials which may contribute to the fire.
- Begin containment and recovery of the spilled materials.

11.7 Evacuation Routes

Evacuation routes have been established by work area locations for this site. All work areas have been provided with designated exit points. Under conditions of extreme emergency, an evacuation should be conducted immediately without regard for equipment.

- Evacuation notification will be a continuous blast on an air horn, vehicle horn, or by verbal communication via radio
- Keep upwind of smoke, vapors, or spill location
- Exit through the decontamination corridor if possible

- If evacuation is not via the decontamination corridor, site personnel should remove contaminated clothing once they are in a location of safety and leave it near the EZ or in a safe place

- Personnel should evacuate to the command post and await instructions at the assembly area.

- The SS will conduct a head count to ensure all personnel have been evacuated safely.

11.8 Emergency Information

Prior to the start of the project, contact will be made with local authorities and emergency services to establish communication channel during an event of emergency and to familiarize the project personnel with the communication procedure and services.

11.8.1 Public Agencies

FIRE/POLICE	_____	
	Emergency	(___) ___-____
	Nonemergency	(___) ___-____
POLICE	_____	
	Emergency	(___) ___-____
	Nonemergency	(___) ___-____
HOSPITAL	_____	
	Emergency	(___) ___-____
	Nonemergency	(___) ___-____

11.8.2 Key Project and IT Personnel

Program Director	Enzo Zoratto	(412) 372-7701
Program Manager	Al Meyers	(513) 782-4505
Project Manager	Frank Haseltine	(412) 372-7701
Site Supervisor	To be determined	(___) ___-____
Program H&S Manager	Warren Houseman	(412) 372-7701
Nearest IT Office General Manager	John C. Wright, Jr.	(412) 372-7701

Site Phone Number		(___) ___-____
Site Fax		(___) ___-____
Occupational Physician	Dr. Ross Myerson 1120 19th Street, N.W. Suite 410 Washington, D.C. 20036	(202) 463-6698
Client Contact	Matt Ellender U.S. Army Corps of Engineers	(402) 221-7766
	Wally Shaheen U.S. Army Corps of Engineers	(402) 241-4260

12.0 Record Keeping and Data Management

Proper record keeping and data management is essential in the implementation of this SSHP. The forms associated with the record keeping and data management requirements must be completed in an accurate, timely fashion and filed with the appropriate entities. It is the responsibility of the SS to ensure that the forms are properly completed. Completed forms will be kept and maintained by IT. These records shall be maintained for a five-year period. Subcontractors will also be responsible for keeping a copy of the forms pertaining to their personnel.

A listing of records to be completed and maintained relative to work at the facility is contained below:

- Training:
  - Respiratory Training Completion Form
  - Tailgate Safety Meeting
  - On-The-Job Training Record (OJTR).

- Medical Records:
  - Medical Examination
  - Supervisor's Employee Injury Report.

- Monitoring:
  - Real-Time Air Monitoring Log
  - Calibration Log
  - Employee notification of results of monitoring for exposure to hazardous substances or harmful physical agents.

- Other Forms:

  - Vehicle Accident Report. Upon occurrence of any accident involving a vehicle. It is very important to obtain information about involved outside parties. The form must be submitted to the appropriate office within 24 hours. Additional information, e.g., police report, is to be forwarded as it becomes available.

  - General Liability, Property Damage, and Loss Report. This form is used to record damage or loss of equipment outside of vehicle accidents (theft, accidental breakage, fire). The procedure for completing and submitting this form is the same as for the vehicle accident report.

- OSHA 200 Form. Injury/illness information from the Supervisor's Employee Injury Report will be logged on an OSHA 200 Form within 6 work days from the occurrence of the incident. The OSHA 200 Form will be maintained at the central fixed location of the IT Pittsburgh Construction and Remediation Services Office, 2790 Mosside Boulevard, Monroeville, Pennsylvania 15146 (Phone: (412) 372-7701). The SS and SSHO can contact the office for this information. Also, an OSHA 2203 poster will be posted in the break area/ command post.

In addition, the SS will keep daily logs which will include the following items:

- Date
- Activity description
- Area (site specific) checked
- Employees in a particular area
- Protective clothing being worn by employees
- Protective devices (including monitoring equipment) being used by employees
- Signature and date.

13.0 Exposure Control Plan

This Exposure Control Plan presents H&S guidelines for designated first aid and CPR care providers. In order to meet the requirements of OSHA 29 CFR 1910.151, during day shift operations, at least two persons on site will be designated and adequately trained in first aid and CPR, in the requirements of the Bloodborne Pathogens Standard as listed in 29 CFR 1910.1030, in IT Procedure HS512, and in the contents of this plan.

13.1 Definition

Bloodborne pathogens are those agents (i.e., bacteria, virus, fungi) found in blood, blood components, certain body fluids, and other materials, objects, or surfaces that have had contact with blood that are capable of causing human disease or death to unprotected people who came into contact with blood or blood-affected items. Diseases caused by bloodborne pathogens include, but are not limited to, hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C, malaria, and syphilis. The most significant and of greatest concern are HBV and HIV.

13.1.1 Hepatitis B Virus

HBV is the major bloodborne pathogen hazard that first aid/CPR care providers are more likely to encounter. The HBV can remain infectious for up to 10 days even in dried blood. The virus adversely affects 8,000 to 10,000 workers annually resulting in approximately 200 deaths each year.

13.1.1.1 Hepatitis Exposure Symptoms

Hepatitis means "inflammation of the liver" causing severe liver damage or cirrhosis. Exposure symptoms include fever, fatigue, nausea, vomiting, muscle aches, loss of appetite, and jaundice (yellowing of the eyes or skin). Hepatitis diagnosis is difficult because some symptoms are similar to the flu and may remain mild for an extended period of time.

Presently, no cure exists for hepatitis, but it can be prevented with a vaccination.

13.1.2 Human Immunodeficiency Virus

HIV attacks and deteriorates the body's immune system and eventually weakens it to the point that infection sets in causing the disease Acquired Immune Deficiency Syndrome

(AIDS). HIV is primarily transmitted through sexual contact, but may also be transmitted through contact with blood and body fluids. HIV is not transmitted by touching or working with people who are HIV-positive.

13.1.2.1 Human Immunodeficiency Virus Exposure Symptoms

HIV leads to AIDS-related illnesses which eventually cause neurological problems, cancer, pneumonia, and death. People carry the virus for many years of their lives without experiencing any symptoms. Upon development, symptoms may include weight loss, skin lesions, dry cough, fever, fatigue, diarrhea, or swelling of the lymph glands.

Presently, no cure exists for HIV or AIDS and no vaccination is currently available.

13.2 Exposure Determination

The purpose of the guidelines in this plan are designed to limit occupational exposure of site workers to infectious blood materials which could result in disease or possibly death. The contents of this plan are intended to protect the designated IT employees trained in first aid and CPR that are responsible for administering medical assistance to site workers.

13.2.1 Means of Transmission

The major activity that may expose any of these designated IT employees to bloodborne pathogens is their response and care to on-site personal injuries, or decontamination of equipment/surfaces contaminated by blood or other potentially infectious materials during the incident.

These designated IT employees could be subject to bloodborne pathogens during rendering of first aid or CPR by accidental exposure due to:

- Punctures through the skin with a contaminated sharp object (i.e., scissors)
- Contact or absorption of blood or blood-contaminated objects through open or broken skin (i.e., cuts, scratches, rashes)
- Blood splashes to their eyes, nose, or mouth or other mucous membranes.

Workers can reduce their risk of contacting HBV or HIV by implementing the recommended work practices (outlined in this plan) before, during, and after responding to emergency medical incidents involving personal injuries.

13.3 Measures for Prevention

The establishment of work practice controls is an integral part of an effective exposure control plan in preventing accidental infection of employees. These work practices are designed to protect employees from reasonably foreseeable occupational exposures to bloodborne pathogens from blood and other potentially infectious material. The work practice controls outlined in this section are applicable to the administration of first aid in emergency situations and subsequent cleanup only.

13.3.1 Universal Precautions

Universal precautions is an approach to infection control which operates on the assumption that all human blood and bodily fluids are to be treated as if they are known to be contaminated with HIV, HBV, or other infectious diseases. Universal precautions shall be implemented whenever there exists a foreseeable potential for contact with blood or bodily fluids.

13.3.2 Engineering Controls

Due to the remote location of the work site, the nature of work in outdoor locations with potential exposure to airborne chemical contaminants, and the potential for exposure being limited to emergency situations, the implementation of engineering controls is not feasible. Exposure control shall be accomplished through implementation of work practice controls and use of PPE.

13.3.3 Work Practice Controls

Work practice controls shall be instituted whenever foreseeable potential contact with, or exposure to, blood and bodily fluid exists. Examples of situations in which these controls are to be implemented include, but are not limited to, accidents or injuries in which administration of first aid is required, application of bandages to minor cuts and abrasions of another person, and contact with sores, wounds, or broken skin.

Following are specific work practice controls that shall be implemented:

- Open wounds or cuts will be promptly bandaged.
- Wash hands and face as soon as possible after administering first aid or CPR. If wash facilities are not readily available, stock disposable one-time use towelettes.
- No eating, drinking, or smoking is allowed in any work area where a potential exists for occupational exposure to bloodborne pathogens.
- Nondisposable equipment or materials that have or may have blood or infectious fluid contact must be washed immediately after their use. (A 1 to 10 solution of bleach and water is recommended proper decontamination.)
- Any clothing that becomes contacted with blood or infectious fluids shall be removed as soon as possible after administering first aid or CPR.
- No personal clothing that becomes contacted with blood or infectious fluids shall be laundered off site.
- Ensure that first-aid kits on site are equipped with a pair of surgical gloves and CPR mouthpieces.

13.3.3.1 Minimization of Contact

Direct contact with blood and bodily fluids should be kept to an absolute minimum, as required in a particular situation. In situations where direct contact is likely, PPE shall be worn to help prevent infection.

Based upon professional judgment, an employee may choose to temporarily forego the use of PPE if he determines that the use of PPE will further jeopardize his well-being or that of the injured worker. This limited application must be carefully evaluated by the employee.

If this does occur, IT is obligated to investigate and document the circumstances in an effort to provide alternative means to avoid further occurrence.

13.3.4 Personal Protective Equipment

The following are specific PPE items that shall be implemented:

- Always wear hand (i.e., latex or nitrile surgical gloves) and eye (i.e., safety glasses, goggles) protection to administer or apply first aid or CPR.
- Always use CPR mouthpieces or ventilation devices.
- Inspect PPE prior to use to ensure it is in good working order and without flaws.
- Do not reuse gloves once removed.
- After use, remove gloves from top to bottom inside-out, not allowing unprotected skin to contact the exterior of the gloves.

13.3.5 Waste Handling

Disposable items that have or may have blood contact must be bagged separately from other trash. These wastes must be placed in leak proof containers or bags and labeled.

A collection container for contaminated articles will be available on site. Wastes used in medical emergency treatment (i.e., gloves, towels, gauze) shall be disposed in the infectious waste container(s). The container will be replaced as needed and not be overfilled.

13.3.6 Waste Disposal

The waste will remain on site in approved container(s) until an approved disposal facility capable of receiving medical wastes is identified. Disposal of the infectious waste container(s) shall be in accordance with applicable local, state, and federal regulations.

13.4 Medical Requirements

The medial requirements of the Exposure Control Plan include provision of a Hepatitis B vaccination to all exposed employees and postexposure procedures and evaluation.

13.4.1 Hepatitis B Vaccination

All potentially exposed employees will have made available to them at no cost a Hepatitis B vaccination. The employee will also receive training as to the vaccine's efficacy, safety, benefits, and consequences prior to administration. The vaccination series shall be initiated within 24 hours of providing first aid/CPR in an incident and shall be administered under the

supervision of a licensed physician. Employees may at their own discretion decline the vaccination, in which case documentation of declination will be completed and employees may be assigned immediately. If an employee covered by this Exposure Control Plan decides to accept the vaccination at a later date, the vaccination will be offered at that time at no cost to the employee.

13.4.2 Postexposure Procedures and Evaluation

Subsequent to all reported exposure incidents, a confidential medical evaluation and follow-up shall be made available to each employee exposed in the incidents.

13.4.2.1 Documentation Procedures

Documentation of the exposure incident shall be recorded as soon as possible, and include the route(s) of exposure, the circumstances surrounding the incident, and the identification of the source individual. Additionally, each incident shall be placed on the "first aid incidental list" attached to the location OSHA Log of Occupational Injuries and Illnesses.

13.4.2.2 Blood Testing

13.4.2.2.1 Source Individuals

As soon as feasible, the source individual in an exposure incident will be asked to consent to a blood test to determine HBV and HIV infectivity. Where applicable laws require employee consent, documented consent shall be obtained prior to testing. If an employee refuses the blood test, documentation of the refusal will be made. Documentation of the test results shall be made available to the exposed employee(s). All results should be kept confidential, as criminal and civil penalties may be charged against persons negligently or wilfully releasing such information, depending on local laws.

13.4.2.2.2 Exposed Employees

Exposed employees will be asked to consent to a blood test for HBV and HIV serological status. If consent to HIV testing is denied, the blood sample will be preserved for 90 days, within such time the employee may elect to consent to the HIV test.

13.4.3 Postexposure Medical Evaluations

Exposed employees shall receive a health care professional's written opinion for postexposure evaluations. The written opinion shall include the results of the evaluation and any medical conditions resulting from the exposure incident which requires further medical treatment.

13.5 Hazard Communication

13.5.1 Warning Labels

Containers used for disposal of blood contaminated supplies and waste will be labeled in accordance with the word "biohazard."

13.5.2 Warning Signs

There are no designated areas for medical treatment on site, since first aid will be provided on an emergency basis only, and; therefore, warning signs are not applicable. In cases of potential exposure, observers and nonessential personnel should be verbally warned to keep a safe distance from injured personnel.

13.5.3 Employee Training Program

All associates who are first aid/CPR trained and may provide assistance shall be trained in the requirements for voluntary providers as described in HS512 and this SSHP, and the general provisions of HS512.

13.6 Recordkeeping

13.6.1 Training Records

All employees selected to attend the training program that covers the contents of this plan shall sign the Acknowledgment Form and the Training Attendance Form.

The training record will contain the date, training outline, name and qualifications of the trainer, and names and job titles of attendees.

At the completion of the training program, all participants must take and pass the training quiz.

The training records will be maintained by the IT Training Department for at least three years from the training date.

13.6.2 Medical Records

Medical records necessary for IT designated employees must include documentation on HBV vaccination status, medical follow-up, postexposure testing, and a medical professional's written evaluation.

13.6.2.1 Maintenance and Transfer of Records

IT shall maintain the employee medical records for the duration of the employee's employment plus 30 years thereafter.

If, for whatever reason, IT no longer does business and no successor exists, IT will notify the Director of NIOSH in writing three months prior to the disposal of records. If so directed, the records shall be transferred to the Director of NIOSH.

13.6.3 Incident Recording

An incident that occurs as a result of rendering emergency medical care will be recorded on the OSHA 200 Log as OSHA defines work-related injuries and illnesses.

TABLES

Table 1
Toxicological Data

Toluene.

Summary of Risks: Toluene is irritating to the eyes, nose, and respiratory tract. Inhalation of high concentrations produces a narcotic effect sometimes leading to coma as well as liver and kidney damage. 93% of inhaled toluene is retained in the body of which 80% is metabolized to benzoic acid, then to hippuric acid and excreted in urine. The remainder is metabolized to *o*-cresol and excreted or exhaled unchanged. Toluene metabolism is inhibited by alcohol ingestion and is synergistic with benzene, asphalt fumes, or chlorinated hydrocarbons (i.e., perchloroethylene). Toluene is readily absorbed through the skin at 14 to 23 $mg/cm^2/hr$. Toluene is absorbed quicker during exercise than at rest and appears to be retained longer in obese versus thin victims; presumably due to its lipid solubility. There is inconsistent data on toluene's ability to damage bone marrow; chronic poisoning has resulted in anemia and leucopenia with biopsy showing bone marrow hypo-plasia. These reports are few and some authorities argue that the effects may have been due to benzene contaminants. Chronic inhalation during pregnancy has been associated with teratogenic effects on the fetus including microcephaly, CNS dysfunction, attentional deficits, developmental delay + language impairment, growth retardation, and physical defects including a small midface, short palpebral fissures, with deep-set eyes, low-set ears, flat nasal bridge with a small nose, micrognathia, and blunt fingertips. There is some evidence that toluene causes an autoimmune illness in which the body produces antibodies that cause inflammation of its own kidney.

Medical Conditions Aggravated by Long-Term Exposure: Alcoholism and CNS, kidney, skin, or liver disease.

Target Organs: CNS, liver, kidney, skin.

Primary Entry Routes: Inhalation, skin contact/absorption.

Acute Effects: Vapor inhalation causes respiratory tract irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, watering eyes, nervousness, insomnia, parasthesis, and vertigo progressing to narcotic coma. Death may result from cardiac arrest due to ventricular fibrillation with catecholamines loss. Liquid splashed in the eye causes conjunctival irritation, transient corneal damage and possible burns. Prolonged skin contact leads to drying and fissured dermatitis. Ingestion causes gastrointestinal tract irritation and symptoms associated with inhalation.

Chronic Effects: Symptoms include mucous membrane irritation, headache, vertigo, nausea, appetite loss and alcohol intolerance. Repeated heavy exposure may result in encephalopathies (cerebellar ataxia and cognitive dysfunction), liver enlargement, and kidney dystrophy (wasting away). Symptoms usually appear at workdays end, worsen at weeks end and decrease or disappear over the weekend.

Table 1
(continued)

Acetone.

Summary of Risks: Acetone has been placed among solvents of comparatively low acute and chronic toxicities. In industry, the most common effects reported are headache from prolonged vapor inhalation and skin irritation resulting from its defatting action. Exposures to less than 1,000 ppm acetone vapor produces only slight eye, nose, and throat irritation. Acetone does not have sufficient warning properties to prevent repeated exposures. It is narcotic at high concentrations, i.e., above 2,000 ppm. Concentrations above 12,000 ppm cause loss of consciousness.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Respiratory and central nervous systems, skin.

Primary Entry Routes: Inhalation, skin and eye contact, ingestion. Liquid acetone is slowly absorbed through the skin.

Acute Effects: Human systemic effects by inhalation include eye, nose, and throat irritation; nausea and vomiting; changes in EEG (electroencephalogram) and carbohydrate metabolism; muscle weakness; drunken behavior; mental confusion; and visual disturbance. In extreme cases, breathing high concentrations may produce coma. Human systemic effects by ingestion include gastrointestinal irritation, kidney damage (often indicated by albumin and red and white blood cells in the urine), liver damage (indicated by high levels of urobilin and early appearance of bilirubin), coma, metabolic changes, and systemic effects described for inhalation. Direct eye contact by liquid acetone may produce painful burning and stinging; watering of eyes; conjunctival inflammation; and corneal injury. Skin contact produces a cold feeling, dryness, and mild irritation.

Chronic Effects: Cases of chronic poisoning resulting from prolonged exposure to low concentrations of acetone are rare. Workers exposed to 1,000 ppm, 3 hours per day for 7 to 15 years, complained of dizziness, asthenia (lack or loss of strength), and chronic inflammation of the airways, stomach, and duodenum. Prolonged or repeated skin contact with liquid acetone may defat the skin and cause eczematoid dermatitis.

Table 2
PPE Selection Matrix

Task	Activity	Initial Level of PPE
Task 1	Mobilization/Demobilization	Level D
Task 2	Excavation of Contaminated Materials	Level D
Task 3	Construction of LTTD Plant	Level D
Task 4	Demonstration Test of LTTD	Level D
Task 5	Confirmatory Sampling	Level D-modified
Task 6	Backfill, Grade, and Restore Site	Level D

Table 3-1
Action Levels

When in Level C PPE

Analyte	Action Level	Required Action[1]
Dust	≥ 5 mg/m^3	Stop work[2]/initiate dust suppression
Unknown VOC's	≥ 100 ppm above background in breathing zone (BZ)	Stop work
O_2	≥ 23% or ≤ 20%	Stop work
LEL/Methane	≥ 10% of LEL	Stop work

When in Level D Modified/D PPE

Analyte	Action Level	Required Action
Dust	≥ 5 mg/m^3	Level C PPE/initiate dust suppression
Unknown VOC's	≥ 10 ppm above background in BZ	Level C PPE
O_2	≥ 23% or ≤ 20%	Stop work
LEL/Methane	≥ 10% of LEL	Stop work

When in Support Zone

Analyte	Action Level	Required Action
Dust	≥ 2.5 mg/m^3	Initiate dust suppression
Unknown VOC's	≥ 1 ppm above background in BZ	Evacuate support zone and reestablish perimeter of EZ.

[1] Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.

[2] Contact with the HSM must be made prior to continuance of work. The HSM may then initiate perimeter/integrated air sampling along with additional engineering controls.

No one is permitted to downgrade levels of PPE without authorization from the HSM.

Table 3-2
Air Monitoring Frequency and Location

WORK ACTIVITY	INSTRUMENT	FREQUENCY[1]	LOCATION
Mobilization/ Demobilization	PID Miniram O_2/LEL Meter NIOSH 5023	Periodically Periodically N/A N/A	BZ of employees BZ of employees N/A N/A
Construction of LTTD plant	PID Miniram O_2/LEL Meter	N/A Continuously N/A	N/A BZ of employees N/A
Operation of LTTD	PID Miniram O_2/LEL Meter	Continuously Continuously Periodically	BZ of employees BZ of employees Various
Excavation of contaminated materials	PID Miniram O_2/LEL Meter	Continuously Continuously N/A	BZ of employees BZ of employees Soil Surface
Confirmatory Sampling	PID Miniram O_2/LEL Meter	Periodically Continuously N/A	BZ of employees BZ of employees Various
Backfill, grade, and restore site	PID Miniram O_2/LEL Meter	N/A Continuously N/A	N/A BZ of employees N/A

[1] Frequency of air monitoring may be adjusted by the HSM after sufficient characterization of site conditions has been completed.

APPENDIX A
SUBCONTRACTOR CERTIFICATION

SUBCONTRACTOR CERTIFICATION

I, _____ as an agent of _____, do hereby certify that the following employees have successfully completed a 40-hour training course which complies with the provisions of 29 CFR 1926.65, and respiratory protection training which complies with 29 CFR 1910.134. Each employee has successfully completed a medical examination which complies with the above regulations.

Individual copies of certification of successful completion of the required training and medical examinations are attached for each employee.

_____ _____

Signature Date

APPENDIX B
CHEMICAL INFORMATION

Genium Publishing Corporation
One Genium Plaza
Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 300
Acetone

Issued: 11/77 Revision: F, 9/92

Section 1. Material Identification

Acetone (CH_3COCH_3) Description: Derived by the dehydrogenation or oxidation of isopropyl alcohol with a metallic catalyst, the oxidation of cumene, the vapor phase oxidation of butane; and as a by-product of synthetic glycerol production. Used as a solvent for paint, varnish, lacquer, fat, oil, wax, resin, rubber, plastic, and rubber cement; to clean and dry parts of precision equipment; in the manufacture of chemicals (methyl isobutyl ketone, methyl isobutyl carbinol, methyl methacrylate, bisphenol-A, acetic acid (ketene process), mesityl oxide, diacetone alcohol, chloroform, iodoform, bromoform), explosives, aeroplane dopes, rayon, photographic films, isoprene; acetylene gas storage cylinders; in purifying paraffin; in nail polish remover; in the extraction of various principles from animal and plant substances; in hardening and dehydrating tissues; in cellulose acetate (especially as spinning solvent); as a solvent for potassium iodide and permanganate; as a delusterant for cellulose acetate fibers; in the specification testing of vulcanized rubber products.

Other Designations: CAS No. 67-64-1, AI3-01238, Chevron acetone, dimethylformaldehyde, dimethylketal, dimethyl ketone, β-ketopropane, methyl ketone, propanone, 2-propanone, pyroacetic acid, pyroacetic ether.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: Acetone vapor is a dangerous fire and explosion hazard. High vapor concentrations may produce narcosis (unconsciousness). Prolonged or repeated skin contact causes dryness, irritation, and mild dermatitis.

R 1
I 1
S 1*
K 3
* Slight skin absorption

NFPA
3 / 1 / 0 / –

HMIS
H 1
F 3
R 0
PPE*
* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Acetone, 99.5% plus 0.5% water

1991 OSHA PELs *
8-hr TWA: 750 ppm (1800 mg/m^3)
15-min STEL: 1000 ppm (2400 mg/m^3)

1990 IDLH Level
20,000 ppm

1990 NIOSH REL
TWA: 250 ppm (590 mg/m^3)

1992-93 ACGIH TLVs
TWA: 750 ppm (1780 mg/m^3)
STEL: 1000 ppm (2380 mg/m^3)

1990 DFG (Germany) MAK
1000 ppm (2400 mg/m^3)
Category IV: Substances eliciting very weak effects (MAK >500 mL/m^3)
Peak: 2000 ppm, 60 min, momentary value†, 3 peaks/shift

1985-86 Toxicity Data ‡
Human, eye: 500 ppm
Human, inhalation, TC_{Lo}: 500 ppm produced olfaction effects, conjunctival irritation, and other changes involving the lungs, thorax, or respiration.
Rat, oral, LD_{50}: 5800 mg/kg altered sleep time and produced tremors.
Mammal, inhalation, TC_{Lo}: 31500 μg/m^3/24 hr administered to pregnant female from the 1st to 13th day of gestation produced effects on fertility (post-implantation mortality).

* In the cellulose acetate fiber industry, enforcement of the OSHA TWA for "doffers" was stayed on 9/5/89 until 9/1/90; the OSHA STEL *does not* apply to that industry.
† Momentary value is a level which the concentration should never exceed.
‡ See NIOSH, *RTECS* (AL3150000), for additional irritation, mutation, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 133.2 °F (56.2 °C) at 760 mm Hg
Freezing Point: -139.6 °F (-95.35 °C)
Vapor Pressure: 180 mm Hg at 68 °F (20 °C), 400 mm Hg at 103.1 °F (39.5 °C)
Saturated Vapor Density (Air = 1.2 kg/m^3, 0.075 lb/ft^3): 1.48 kg/m^3, .093 lb/ft^3
Refractive Index: 1.3588 at 20 °C
Appearance and Odor: Colorless, highly volatile liquid; sweetish odor.
Molecular Weight: 58.08
Specific Gravity: 0.7899 at 20 °C/4 °C
Water Solubility: Soluble
Other Solubilities: Alcohol, benzene, dimethyl formamide, chloroform, ether, and most oils.
Odor Threshold: 47.5 mg/m^3 (low), 1613.9 mg/m^3 (high)*

* Odor thresholds recorded as a range from the lowest to the highest concentration.

Section 4. Fire and Explosion Data

Flash Point: 0 °F (-18 °C), CC	Autoignition Temperature: 869 °F (465 °C)	LEL: 2.6% v/v	UEL: 12.8% v/v

Extinguishing Media: *Do not* extinguish fire unless flow can be stopped. For small fires, use dry chemical, carbon dioxide (CO_2), water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water in flooding quantities as fog because solid streams may be ineffective. **Unusual Fire or Explosion Hazards:** Acetone is a dangerous fire and explosion hazard; it is a Class IB flammable liquid. Vapors may travel to a source of ignition and flash back, fire-exposed containers may explode, and a vapor explosion hazard may exist indoors, outdoors, or in sewers. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing provides limited protection. If feasible, remove all fire-exposed containers. Otherwise, apply cooling water to sides of containers until well after fire is extinguished. If the fire becomes uncontrollable or container is exposed to direct flame, consider evacuation of a one-third mile radius. In case of rising sound from venting safety device or any discoloration of tank during fire, withdraw immediately. For massive cargo fires, use unmanned hose holder or monitor nozzles. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Acetone is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. **Chemical Incompatibilities:** Acetone may form explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anhydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide. Acetone reacts vigorously with oxidizing materials and ignites on contact with activated carbon, chromium trioxide, dioxygen difluoride + carbon dioxide, and potassium-*tert*-butoxide. Other incompatibles include air, bromoform, bromine, chloroform + alkalies, trichloromelamine, and sulfur dichloride. **Conditions to Avoid:** Keep acetone away from plastic eyeglass frames, jewelry, pens, pencils, and rayon garments. **Hazardous Products of Decomposition:** Thermal oxidative decomposition of acetone can produce CO_2 and carbon monoxide (CO).

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[164] do not list acetone as a carcinogen. **Summary of Risks:** Acetone has been placed among solvents of comparatively low acute and chronic toxicities. In industry, the most common effects reported are headache from prolonged vapor inhalation and skin irritation resulting from its defatting action. Exposures to less than 1000 ppm acetone vapor produces only slight eye, nose, and throat irritation. Acetone does not have sufficient warning properties to prevent repeated exposures. It is narcotic at high concentrations, i.e., above 2000 ppm. Concentrations above 12000 ppm cause loss of consciousness.

Continue on next page

Copyright © 1992 Genium Publishing Corporation. Any commercial use or reproduction without the publisher's permission is prohibited.

Section 6. Health Hazard Data,*continued*

Medical Conditions Aggravated by Long-Term Exposure: None reported. **Target Organs:** Respiratory and central nervous systems, skin. **Primary Entry Routes:** Inhalation, skin and eye contact, ingestion. Liquid acetone is slowly absorbed through the skin. **Acute Effects:** Human systemic effects by inhalation include eye, nose and throat irritation; nausea and vomiting; changes in EEG (electroencephalogram) and carbohydrate metabolism; muscle weakness; drunken behavior; mental confusion and visual disturbance. In extreme cases, breathing high concentrations may produce coma. Human systemic effects by ingestion include gastrointestinal irritation, kidney damage (often indicated by albumin and red and white blood cells in the urine), liver damage (indicated by high levels of urobilin and early appearance of bilirubin), coma, metabolic changes, and systemic effects described for inhalation. Direct eye contact by liquid acetone may produce painful burning and stinging; watering of eyes; conjuctival inflammation; and corneal injury. Skin contact produces a cold feeling, dryness, and mild irritation.
Chronic Effects: Cases of chronic poisoning resulting from prolonged exposure to low concentrations of acetone are rare. Workers exposed to 1000 ppm, 3 hrs per day for 7-15 yrs, complained of dizziness, asthenia (lack or loss of strength), and chronic inflammation of the airways, stomach, and duodenum. Prolonged or repeated skin contact with liquid acetone may defat the skin and cause eczematoid dermatitis.
FIRST AID
Eyes: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. Carefully dispose of contaminated clothing because it may pose a fire hazard. **Inhalation:** Remove exposed person to fresh air, monitor for respiratory distress, and administer 100% humidified supplemental oxygen as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have that *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting. **After first aid, get appropriate in-plant, paramedic, or community medical support.**
Note to Physicians: In symptomatic patients, monitor serum and urine acetone, fluid intake, blood glucose, and arterial pH. Because of the prolonged elimination half-life of acetone, the symptomatic patient may need medical supervision for many hours (up to 30 hrs). Patients may develop hyperglycemia and ketosis mimicking acute diabetic coma. The hyperglycemia may persist for several days following acute exposure.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, remove all heat and ignition sources, and provide adequate ventilation. Cleanup personnel should protect against inhalation and skin or eye contact. If feasible and without risk, stop leak. Use water spray to reduce vapor, but it may not prevent ignition in closed spaces. For small spills, take up with sand or other noncombustible absorbent material and using nonsparking tools, place into containers for later disposal. For large spills, dike far ahead of liquid spill for later disposal. Do not release to sewers or waterways. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Toxicity:** LC_{50} *Salmo gairdneri* (rainbow trout): 5540 mg/L/96 hr at 54 °F (12 °C). LC_{50} (oral) Ring-necked pheasant: >40,000 ppm. **Environmental Degradation:** Acetone biodegrades when released into the environment. The biological oxygen demand for 5 days (BOD5) is 46-55%. **Soil Absorption/Mobility:** Acetone volatilizes, leaches, and biodegrades if released on soil. **Disposal:** Acetone is a good candidate for fluidized bed, rotary kiln incineration, or catalytic oxidation. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33): Hazardous Waste No. U002 (Ignitability), (40 CFR 261.31): F003 (spent solvent)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 5000 lb (2270 kg) [* per Clean Water Act, Sec. 311(b)(4)]
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For concentrations < 1000 ppm, wear any chemical cartridge respirator with organic vapor cartridge(s) and wear eye protection to avoid irritation or damage. For concentrations <6250 ppm, wear any supplied-air respirator operated in a continuous-flow mode. For concentrations < 12,500 ppm, wear any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister. For concentrations < 20,000 ppm, wear any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Polyethylene/ethylene vinyl alcohol, Teflon, or butyl rubber with breakthrough times > 8 hr is recommended for PPE . **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[103] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in closed containers in a cool, dry well-ventilated area away from heat, sparks, flames, and other incompatibles. Keep large stocks away from inhabited buildings. Use non-sparking tools to open containers. Keep dry chemical or CO_2 extinguishers on hand in case of fire. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. To prevent static sparks, electrically ground and bond all containers and equipment during fluid transfer. For bulk storage rooms, install electrical equipment, Class I, Group D. **Administrative Controls:** Consider replacement and periodic medical examinations with emphasis on the skin and respiratory tract. Also consider liver and kidney function tests and urinalysis.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Acetone	Packaging Authorizations	Quantity Limitations	Vessel Storage Requirements
DOT Hazard Class: 3	a) Exceptions: 173.150	a) Passenger, Aircraft, or Railcar: 5L	Vessel Stowage: B
ID No.: UN1090	b) Non-bulk Packaging: 173.202	b) Cargo Aircraft Only: 60L	Other: --
DOT Packaging Group: II	c) Bulk Packaging: 173.242		
DOT Label: Flammable Liquid			
Special Provisions (172.102): T8			

SDS Collection References: 26, 73, 100, 101, 103, 124, 126, 127, 132, 133, 136, 139, 140, 148, 149, 153, 159, 163, 164, 167, 168, 171, 174, 176, 180
Prepared by: MJ Wurth, BS; **Industrial Hygiene Review:** PA Roy, MPH, CIH; **Medical Review:** AC Darlington, MPH, MD

Copyright © 1992 by Genium Publishing Corporation. Any commercial use or reproduction without the publisher's permission is prohibited. Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Publishing Corporation extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Genium Publishing Corporation
One Genium Plaza
Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:
Sheet No. 317
Toluene
Issued: 8/79 Revision: E, 9/92 Errata: 2/94

Section 1. Material Identification

Toluene ($C_6H_5CH_3$) Description: Derived from petroleum i.e., dehydrogenation of cycloparaffin fractions followed by the aromatization of saturated aromatic hydrocarbons or by fractional distillation of coal-tar light oil and purified by rectification. Used widely as a solvent (replacing benzene in many cases) for oils, resins, adhesives, natural rubber, coal tar, asphalt, pitch, acetyl celluloses, cellulose paints and varnishes; a diluent for photogravure inks, raw material for organic synthesis (benzoyl & benzilidene chlorides, saccharine, TNT, toluene diisocyanate, and many dyestuffs), in aviation and high octane automobile gasoline, as a nonclinical thermometer liquid and suspension solution for navigational instruments.
Other Designations: CAS No. 108-88-3, Methacide, methylbenzene, methylbenzol, phenylmethane, toluol, Tolu-sol.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: Toluene is an eye, skin, and respiratory tract irritant becoming narcotic at high centrations. Liver and kidney damage has occurred. Pregnant women chronically exposed to toluene have shown teratogenic effects. Toluene is highly flammable.

R 1
I 3
S 2*
K 3
* Skin absorption

NFPA: 3 / 2 / 0 / -

HMIS
H 2- Chronic effects
F 3
R 0
PPE-Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Toluene, < 100%; may contain a small amount of benzene (~ 1%), xylene, and nonaromatic hydrocarbons.

1991 OSHA PELs
8-hr TWA: 100 ppm (375 mg/m^3)
15-min STEL: 150 ppm (560 mg/m^3)

1990 IDLH Level
2000 ppm

1990 NIOSH RELs
TWA: 100 ppm (375 mg/m^3)
STEL: 150 ppm (560 mg/m^3)

1992-93 ACGIH TLV (Skin)
TWA: 50 ppm (188 mg/m^3)

1990 DFG (Germany) MAK*
TWA: 100 ppm (380 mg/m^3)
Half-life: 2 hr to end of shift
Category II: Substances with systemic effects
Peak Exposure Limit: 500 ppm, 30 min average value, 2/shift

1985-86 Toxicity Data†
Man, inhalation, TC_{Lo}: 100 ppm caused hallucinations, and changes in motor activity and changes in psychophysiological tests.
Human, oral, LD_{Lo}: 50 mg/kg; toxic effects not yet reviewed
Human, eye: 300 ppm caused irritation.
Rat, oral, LD_{50}: 5000 mg/kg
Rat, liver: 30 µmol/L caused DNA damage.

* Available information suggests damage to the developing fetus is probable.
†See NIOSH, *RTECS* (XS5250000), for additional irritation, mutation, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 232 °F (110.6 °C)
Melting Point: -139 °F (-95 °C)
Molecular Weight: 92.15
Density: 0.866 at 68 °F (20/4 °C)
Surface Tension: 29 dyne/cm at 68 °F (20 °C)
Viscosity: 0.59 cP at 68 °F (20 °C)
Refraction Index: 1.4967 at 20 °C/D

Water Solubility: Very slightly soluble, 0.6 mg/L at 68 °F (20 °C)
Other Solubilities: Soluble in acetone, alcohol, ether, benzene, chloroform, glacial acetic acid, petroleum ether, and carbon disulfide.
Vapor Pressure: 22 mm Hg at 68 °F (20 °C); 36.7 mm Hg at 86 °F (30 °C)
Saturated Vapor Density (Air = 0.075 lb/ft^3 or 1.2 kg/m^3): 0.0797 lb/ft^3 or 1.2755 kg/m^3
Odor Threshold (range of all referenced values): 0.021 to 69 ppm

Appearance and Odor: Colorless liquid with a sickly sweet odor.

Section 4. Fire and Explosion Data

Flash Point: 40 °F (4.4 °C) CC	Autoignition Temperature: 896 °F (480 °C)	LEL: 1.27% v/v	UEL: 7.0% v/v

Extinguishing Media: Toluene is a Class 1B flammable liquid. To fight fire, use dry chemical carbon dioxide, or 'alcohol-resistant' foam. Water spray may be ineffective as toluene floats on water and may actually spread fire. **Unusual Fire or Explosion Hazards:** Concentrated vapors are heavier than air and may travel to an ignition source and flash back. Container may explode in heat of fire. Toluenes' burning rate = 5.7 mm/min and its flame speed = 37 cm/sec. Vapor poses an explosion hazard indoors, outdoors, and in sewers. May accumulate static electricity. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighter's protective clothing provides only limited protection. Apply cooling water to sides of tanks until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if impossible, withdraw from fire and let burn. Withdraw immediately if you hear a rising sound from venting safety device or notice any tank discoloration due to fire because a BLEVE (boiling liquid expanding vapor explosion) may be imminent. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Toluene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization can't occur. **Chemical Incompatibilities:** Strong oxidizers, concentrated nitric acid, nitric acid + sulfuric acid, dinitrogen tetroxide, silver perchlorate, bromine trifluoride, tetranitromethane, and 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione. **Conditions to Avoid:** Contact with heat, ignition sources, or incompatibles. **Hazardous Products of Decomposition:** Thermal oxidative decomposition of toluene can produce carbon dioxide, and acrid, irritating smoke.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[164] do not list toluene as a carcinogen. **Summary of Risks:** Toluene is irritating to the eyes, nose, and respiratory tract. Inhalation of high concentrations produces a narcotic effect sometimes leading to coma as well as liver and kidney damage. 93% of inhaled toluene is retained in the body of which 80% is metabolized to benzoic acid, then to hippuric acid and excreted in urine. The remainder is metabolized to *o*-cresol and excreted or exhaled unchanged. Toluene metabolism is inhibited by alcohol ingestion and is synergistic with benzene, asphalt fumes, or chlorinated hydrocarbons (i.e. perchloroethylene). Toluene is readily absorbed through the skin at 14 to 23 mg/cm^2/hr. Toluene is absorbed quicker during exercise than at rest and appears to be retained longer in obese versus thin victims; presumably due to its lipid solubility. There is inconsistent data on toluene's ability to damage bone marrow; chronic poisoning has resulted in anemia and leucopenia with biopsy showing bone marrow hypo-plasia. These reports are few and some authorities argue that the effects may have been due to benzene contaminants. Chronic inhalation during pregnancy has been associated with teratogenic effects on the fetus including microcephaly, CNS dysfunction, attentional deficits, developmental delay + language impairment, growth retardation, and physical defects including a small midface, short palpebral fissures, with deep-set eyes, low-set ears, flat nasal bridge with a small nose, micrognathia, and blunt fingertips. There is some evidence that toluene causes an autoimmune illness in which the body produces antibodies that cause inflammation of its own kidney.

Continue on next page

Copyright © 1992 Genium Publishing Corporation. Any commercial use or reproduction without the publisher's permission is prohibited.

Medical Conditions Aggravated by Long-Term Exposure: Alcoholism and CNS, kidney, skin, or liver disease. **Target Organs:** CNS, liver, kidney, skin. **Primary Entry Routes:** Inhalation, skin contact/absorption. **Acute Effects:** Vapor inhalation causes respiratory tract irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, watering eyes, nervousness, insomnia, parasthesis, and vertigo progressing to narcotic coma. Death may result from cardiac arrest due to ventricular fibrillation with catecholamines loss. Liquid splashed in the eye causes conjunctival irritation, transient corneal damage and possible burns. Prolonged skin contact leads to drying and fissured dermatitis. Ingestion causes GI tract irritation and symptoms associated with inhalation. **Chronic Effects:** Symptoms include mucous membrane irritation, headache, vertigo, nausea, appetite loss and alcohol intolerance. Repeated heavy exposure may result in encephalopathies (cerebellar ataxia and cognitive dysfunction), liver enlargement, and kidney dystrophy (wasting away). Symptoms usually appear at workdays end, worsen at weeks end and decrease or disappear over the weekend. **FIRST AID** **Eyes:** *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult an ophthalmologist immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center and unless otherwise advised, have that *conscious and alert* person drink 1 to 2 glasses of water to dilute. *Do not* induce vomiting because of danger of aspiration into the lungs. Gastric lavage may be indicated if large amounts are swallowed; potential toxicity needs to be weighed against aspiration risk when deciding for or against gastric lavage. **Note to Physicians:** Monitor cardiac function. If indicated, use epinephrine and other catecholamines carefully, because of the possibility of a lowered myocardial threshold to the arrhythmogenic effects of such substances. Obtain CBC, electrolytes, and urinalysis. Monitor arterial blood gases. If toluene has > 0.02% (200 ppm) benzene, evaluate for potential benzene toxicity. BEI: hippuric acid in urine, sample at shift end (2.5 g/g creatinine); Toluene in venous blood, sample at shift end (1.0 mg/L).

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Cleanup personnel protect against inhalation and skin/eye contact. Use water spray to cool and disperse vapors but it may not prevent ignition in closed spaces. Cellosolve, hycar absorbent materials, and fluorocarbon water can also be used for vapor suppression/containment. Take up small spill with earth, sand, vermiculite, or other absorbent, noncombustible material. Dike far ahead of large spills for later reclamation or disposal. For water spills, (10 ppm or greater) apply activated carbon at 10X the spilled amount and remove trapped material with suction hoses or use mechanical dredges/lifts to remove immobilized masses of pollutants and precipitates. Toluene can undergo fluidized bed incineration at 842 to 1796 °F (450 to 980 °C), rotary kiln incineration at 1508 to 2912 °F (820 to 1600 °C), or liquid injection incineration at 1202 to 2912 °F (650 to 1600 °C). Follow applicable OSHA regulations (29 CFR 1910.120). **Ecotoxicity Values:** Blue gill, LC_{50} = 17 mg/L/24 hr; shrimp (*Crangonfracis coron*), LC_{50} = 4.3 ppm/96 hr; fathead minnow (*Pimephales promelas*), LC_{50} = 36.2 mg/L/96 hr. **Environmental Degradation:** If released to land, toluene evaporates and undergoes microbial degradation. In water, toluene volatilizes and biodegrades with a half-life of days to several weeks. In air, toluene degrades by reaction with photochemically produced hydroxyl radicals. **Disposal:** Treat contaminated water by gravity separation of solids, followed by skimming of surface. Pass through dual media filtration and carbon absorption units (carbon ratio 1 kg to 10 kg soluble material). Return waste water from backwash to gravity separator. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33): No. U220
SARA Extremely Hazardous Substance (40 CFR 355), TPQ: Not listed
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 1000 lb (454 kg)
[* per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307 (a)]
Listed as a SARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses with shatter-resistant glass and side-shields or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For < 1000 ppm, use any chemical cartridge respirator with appropriate organic vapor cartridges, any supplied-air respirator (SAR), or SCBA. For < 2000 ppm, use any SAR operated in continuous-flow mode, any SAR or SCBA with a full facepiece, or any air-purifying respirator with a full facepiece having a chin-style, front or back mounted organic vapor canister. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Polyvinyl alcohol with a breakthrough time of > 8 hr, Teflon and Viton are recommended as suitable materials for PPE. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[103] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes and launder before reuse. Remove toluene from your shoes and clean PPE. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Prevent physical damage to containers. Store in a cool, dry, well-ventilated area away from ignition sources and incompatibles. Outside or detached storage is preferred. If stored inside, use a standard flammable liquids warehouse, room, or cabinet. To prevent static sparks, electrically ground and bond all equipment used with toluene. Do not use open lights in toluene areas. Install Class 1, Group D electrical equipment. Check that toluene is free of or contains < 1% benzene before use. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. **Administrative Controls:** Adopt controls for confined spaces (29 CFR 1910.146) if entering areas of unknown toluene levels (holes, wells, storage tanks). Consider preplacement and periodic medical exams of exposed workers that emphasize the CNS, liver, kidney, and skin. Include hemocytometric and thrombocyte count in cases where benzene is a contaminant of toluene. Monitor air at regular intervals to ensure effective ventilation.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Toluene
DOT Hazard Class: 3
ID No.: UN1294
DOT Packing Group: II
DOT Label: Flammable Liquid
Special Provisions (172.102): T1

Packaging Authorizations
a) Exceptions: 150
b) Non-bulk Packaging: 202
c) Bulk Packaging: 242

Quantity Limitations
a) Passenger Aircraft or Railcar: 5L
b) Cargo Aircraft Only: 60L

Vessel Stowage Requirements
Vessel Stowage: B
Other: --

MSDS Collection **References:** 26, 73, 100, 101, 103, 124, 126, 127, 132, 140, 148, 153, 159, 163, 164, 167, 169, 171, 174, 175, 176, 180.
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** PA Roy, CIH, MPH; **Medical Review:** AC Darlington, MD, MPH

Copyright © 1992 by Genium Publishing Corporation. Any commercial use or reproduction without the publisher's permission is prohibited. Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Publishing Corporation extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

APPENDIX C
SITE AND HOSPITAL LOCATION MAPS

APPENDIX D
UNDERGROUND/OVERHEAD UTILITY CHECKLIST

UNDERGROUND/OVERHEAD UTILITY CHECKLIST

Project Name/Number_____ **Date**_____

Location_____

This checklist must be completed for any intrusive subsurface work such as excavating or drilling. It records the fact that all underground and overhead structures and utilities in the work area are identified and located. The Project Manager must request utility markouts before the start of field operations to allow the client and utility companies time to complete them. If complete information is not available, a magnetometer survey must be performed to locate obstacles prior to excavating or drilling.

Procedure

A diagram of the project area depicting the proposed location of excavation or drilling sites must be attached to this H&S Plan. The diagram must clearly indicate the areas checked for underground structures/utilities, and overhead power lines. This form and the diagram must be signed by the Project Manager, the IT Field Supervisor, and the client representative (if applicable).

Checklist

TYPE OF STRUCTURE	PRESENT	NOT PRESENT	METHOD OF MARKOUT
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Steam Line			
Sewer Line			
Drain Line			
Underground Tank			
Overhead Power Line			
Overhead Product Line			
Septic Tank/Drain			

Client Representative (If applicable) _____ _____
(Signature) (Date)

IT Project Manager _____ _____
(Signature) (Date)

IT [illegible]pervisor _____ _____
(Signature) (Date)

Quanterra
Environmental Services

Quanterra Incorporated
5103 Old William Penn Highway
Export, Pennsylvania 15632

412 731-8806 Telephone
412 327-7231 Fax

IT Corporation/Fort Story
2790 Mosside Boulevard
Monroeville, PA 15146
Attn: Tom Mathison

September 19, 1994

Job Number: Q409096/099

The Certificate of Analysis is for the following:

Client Project ID:	519201
Date Received by Lab:	09/10/94
Number of Samples:	Sixteen
Sample Type:	Soil/Water

1.0 Introduction

On September 10, 1994, fifteen soil and one water samples were received at ITAS Pittsburgh, labeled as follows:

Soil:	C-1	Water:	TRIP BLANK
	B-3		
	B-2		
	B-1		
	A-2		
	A-10		
	A-9		
	A-8		
	A-7		
	A-6		
	A-5		
	A-4		
	A-3		
	A-11		
	A-1		

Reviewed and Approved: Carrie L. Smith-Gamber

Carrie L. Smith-Gamber, Project Manager

Quanterra
Environmental Services

2.0 Analytical Results/Methodology

Results are presented in the enclosed tables, and were determined in accordance with Methods 3010, 3050, 6010, 7470, and 8240, Test Methods for Evaluating Solid Waste, EPA SW-846, 3rd ed., 1986; Method 9095, Test Methods for Evaluating Solid Waste, EPA, SW-846, 3rd Ed., 1986; Method 418.1, Method for the Chemical Analysis of Water and Waste, EPA, 600/4-79-020, 1983 revision; Federal Register, Vol. 57, No. 227, Tuesday, November 24, 1992; and Environmental Protection Agency, CLP SOW No. 7/88, Section IV, Exhibit-D, Part F, July 1988.

Results of sample concentrations are based on dry weight and expressed in milligrams per liter and milligrams per kilogram or parts per million. ND denotes that the compound is not detected at or above the indicated detection limit.

The analysis for BTEX and TOX were performed at our Quanterra Laboratory in Austin, Texas. These results are enclosed.

The TRIP BLANK was canceled on September 13, 1994 as per Tom Mathison.

Volatiles

Sample A-2 was analyzed twice due to the surrogate toluene-d_8 being outside QC limits. Both analyses are reported.

3.0 Quality Control

QA/QC information can be found immediately following the analytical data.

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: B-3
Sample Date: 09/08/94
Lab Sample ID: Q40909602
Analysis Date: 09/13/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND11	1,2-Dichloropropane	ND5
Bromomethane	ND11	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND11	Trichloroethene	ND5
Chloroethane	ND11	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND110	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND54
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND54
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND110	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND54	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND11

	Surrogate Spike Percent Recovery
Method Blank No. 1	
Toluene-d_8	100%
Bromofluorobenzene	90%
1,2-Dichloroethane-d_4	101%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: B-2
Sample Date: 09/08/94
Lab Sample ID: Q40909603
Analysis Date: 09/13/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND98	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND49
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND49
Chloroform	ND5	Tetrachloroethene	66
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND98	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND49	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Method Blank No. 1	
Toluene-d_8	105%
Bromofluorobenzene	88%
1,2-Dichloroethane-d_4	106%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: B-1
Sample Date: 09/08/94
Lab Sample ID: Q40909604
Analysis Date: 09/13/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND11	1,2-Dichloropropane	ND5
Bromomethane	ND11	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND11	Trichloroethene	ND5
Chloroethane	ND11	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND110	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND54
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND54
Chloroform	ND5	Tetrachloroethene	28
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND110	Toluene	10
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND54	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND11

	Surrogate Spike Percent Recovery
Method Blank No. 1	
Toluene-d_8	112%
Bromofluorobenzene	85%
1,2-Dichloroethane-d_4	109%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-2
Sample Date: 09/08/94
Lab Sample ID: Q40909605
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND99	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND50
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND50
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND99	Toluene	8
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND50	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Method Blank No. 2	
Toluene-d_8	125% *
Bromofluorobenzene	91%
1,2-Dichloroethane-d_4	98%

*Outside QC limits.

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-2 Reanalysis
Sample Date: 09/08/94
Lab Sample ID: Q40909605
Analysis Date: 09/13/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND11	1,2-Dichloropropane	ND5
Bromomethane	ND11	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND11	Trichloroethene	ND5
Chloroethane	ND11	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND110	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND55
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND55
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND110	Toluene	10
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	8	Ethylbenzene	ND5
Vinyl acetate	ND55	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND11

Surrogate Spike
Percent Recovery

Method Blank No. 1

Toluene-d_8	119%	*
Bromofluorobenzene	81%	
1,2-Dichloroethane-d_4	104%	

*Outside QC limits.

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-5
Sample Date: 09/08/94
Lab Sample ID: Q40909611
Analysis Date: 09/13/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND26	1,2-Dichloropropane	ND13
Bromomethane	ND26	cis-1,3-Dichloropropene	ND13
Vinyl chloride	ND26	Trichloroethene	ND13
Chloroethane	ND26	Dibromochloromethane	ND13
Methylene chloride	ND13	1,1,2-Trichloroethane	ND13
Acetone	510	Benzene	ND13
Carbon disulfide	ND13	trans-1,3-Dichloropropene	ND13
1,1-Dichloroethene	ND13	Bromoform	ND13
1,1-Dichloroethane	ND13	4-Methyl-2-pentanone	ND130
1,2-Dichloroethene (total)	ND13	2-Hexanone	ND130
Chloroform	ND13	Tetrachloroethene	ND13
1,2-Dichloroethane	ND13	1,1,2,2-Tetrachloroethane	ND13
2-Butanone	ND260	Toluene	ND13
1,1,1-Trichloroethane	ND13	Chlorobenzene	ND13
Carbon tetrachloride	ND13	Ethylbenzene	ND13
Vinyl acetate	ND130	Styrene	ND13
Bromodichloromethane	ND13	Xylenes (total)	ND13
		2-Chloroethylvinylether	ND26

	Surrogate Spike Percent Recovery
Method Blank No. 1	
Toluene-d_8	105%
Bromofluorobenzene	91%
1,2-Dichloroethane-d_4	113%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-3
Sample Date: 09/08/94
Lab Sample ID: Q40909613
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND100	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND52
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND52
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND100	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND52	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Method Blank No. 2	
Toluene-d_8	106%
Bromofluorobenzene	91%
1,2-Dichloroethane-d_4	86%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-11
Sample Date: 09/08/94
Lab Sample ID: Q40909614
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND100	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND51
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND51
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND100	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND51	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Method Blank No. 2	
Toluene-d_8	98%
Bromofluorobenzene	92%
1,2-Dichloroethane-d_4	97%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-1
Sample Date: 09/08/94
Lab Sample ID: Q40909615
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND100	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND52
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND52
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND100	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND52	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Method Blank No. 2	
Toluene-d_8	93%
Bromofluorobenzene	89%
1,2-Dichloroethane-d_4	84%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-11 MSD
Sample Date: 09/08/94
Lab Sample ID: Q40909616
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND100	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND52
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND52
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND100	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND52	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Method Blank No. 2	
Toluene-d_8	98%
Bromofluorobenzene	95%
1,2-Dichloroethane-d_4	93%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Client Sample ID: A-11 MS
Sample Date: 09/08/94
Lab Sample ID: Q40909617
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND11	1,2-Dichloropropane	ND5
Bromomethane	ND11	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND11	Trichloroethene	ND5
Chloroethane	ND11	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND110	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND54
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND54
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND110	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND54	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND11

	Surrogate Spike Percent Recovery
Method Blank No. 2	
Toluene-d_8	102%
Bromofluorobenzene	96%
1,2-Dichloroethane-d_4	96%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Lab Sample ID: Method Blank No. 1
Analysis Date: 09/13/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND100	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND50
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND50
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND100	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND50	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Toluene-d_8	94%
Bromofluorobenzene	87%
1,2-Dichloroethane-d_4	91%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Organic Compounds

Lab Sample ID: Method Blank No. 2
Analysis Date: 09/14/94

Compound	Concentration µg/Kg	Compound	Concentration µg/Kg
Chloromethane	ND10	1,2-Dichloropropane	ND5
Bromomethane	ND10	cis-1,3-Dichloropropene	ND5
Vinyl chloride	ND10	Trichloroethene	ND5
Chloroethane	ND10	Dibromochloromethane	ND5
Methylene chloride	ND5	1,1,2-Trichloroethane	ND5
Acetone	ND100	Benzene	ND5
Carbon disulfide	ND5	trans-1,3-Dichloropropene	ND5
1,1-Dichloroethene	ND5	Bromoform	ND5
1,1-Dichloroethane	ND5	4-Methyl-2-pentanone	ND50
1,2-Dichloroethene (total)	ND5	2-Hexanone	ND50
Chloroform	ND5	Tetrachloroethene	ND5
1,2-Dichloroethane	ND5	1,1,2,2-Tetrachloroethane	ND5
2-Butanone	ND100	Toluene	ND5
1,1,1-Trichloroethane	ND5	Chlorobenzene	ND5
Carbon tetrachloride	ND5	Ethylbenzene	ND5
Vinyl acetate	ND50	Styrene	ND5
Bromodichloromethane	ND5	Xylenes (total)	ND5
		2-Chloroethylvinylether	ND10

	Surrogate Spike Percent Recovery
Toluene-d_8	98%
Bromofluorobenzene	105%
1,2-Dichloroethane-d_4	95%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Volatile Matrix Spike Percent Recovery

Client Sample ID: A-11

Compound	Matrix Spike Percent Recovery
1,1-Dichloroethene	92%/93%
Trichloroethene	108%/117%
Benzene	116%/119%
Toluene	120%/120%
Chlorobenzene	117%/121%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Total Petroleum Hydrocarbons

Client Sample ID: See below
Sample Date: 09/08/94
Analysis Date: 09/14 and 16/94

Client Sample ID	Lab Sample ID	Total Petroleum Hydrocarbons mg/Kg	Matrix Spike Percent Recovery
C-1	Q40909601	19	--
B-3	Q40909602	1,600	--
A-2	Q40909605	9,900	--
A-10	Q40909606	140	--
A-11	Q40909614	720/720	105%
A-1	Q40909615	1,400	--
--	Method Blank 09/14/94	ND17	--
--	Method Blank 09/16/94	ND17	--

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra
Environmental Services

TCLP Metals Analysis

Client Sample ID: B-3
Sample Date: 09/08/94
Lab Sample ID: Q40909602
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	ND0.5
Cadmium	0.007
Chromium	ND0.05
Lead	0.45
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-2
Sample Date: 09/08/94
Lab Sample ID: Q40909605
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.6
Cadmium	0.02
Chromium	ND0.5
Lead	1.0
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-9
Sample Date: 09/08/94
Lab Sample ID: Q40909607
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	ND0.5
Cadmium	ND0.005
Chromium	ND0.05
Lead	ND0.05
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.1

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-8
Sample Date: 09/08/94
Lab Sample ID: Q40909608
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.5
Cadmium	ND0.005
Chromium	ND0.05
Lead	0.11
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-7
Sample Date: 09/08/94
Lab Sample ID: Q40909609
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.5
Cadmium	0.006
Chromium	ND0.05
Lead	0.85
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-6
Sample Date: 09/08/94
Lab Sample ID: Q40909610
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.6
Cadmium	ND0.005
Chromium	ND0.05
Lead	0.51
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-5
Sample Date: 09/08/94
Lab Sample ID: Q40909611
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.6
Cadmium	0.007
Chromium	ND0.05
Lead	1.1
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra
Environmental Services

TCLP Metals Analysis

Client Sample ID: A-4
Sample Date: 09/08/94
Lab Sample ID: Q40909612
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.7
Cadmium	0.012
Chromium	ND0.05
Lead	1.0
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra
Environmental Services

TCLP Metals Analysis

Client Sample ID: A-3
Sample Date: 09/08/94
Lab Sample ID: Q40909613
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.6
Cadmium	0.005
Chromium	ND0.05
Lead	0.31
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-11
Sample Date: 09/08/94
Lab Sample ID: Q40909614
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L	Matrix Spike Percent Recovery
Arsenic	ND0.3	101%
Barium	0.06	92%
Cadmium	0.006	94%
Chromium	ND0.05	91%
Lead	0.57	97%
Mercury	ND0.0002	81%
Selenium	ND0.3	105%
Silver	ND0.01	88%

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Client Sample ID: A-1
Sample Date: 09/08/94
Lab Sample ID: Q40909615
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	0.6
Cadmium	0.006
Chromium	ND0.05
Lead	0.55
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Lab Sample ID: TCLP Preparation Blank
TCLP Extraction Date: 09/13/94
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	ND0.5
Cadmium	ND0.005
Chromium	ND0.05
Lead	ND0.05
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.1

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

TCLP Metals Analysis

Lab Sample ID: Method Blank
Analysis Date: 09/15/94
Mercury: 09/14/94

Parameter	Concentration mg/L
Arsenic	ND0.3
Barium	ND0.5
Cadmium	ND0.005
Chromium	ND0.05
Lead	ND0.05
Mercury	ND0.0002
Selenium	ND0.3
Silver	ND0.01

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

Total Metals Analysis

Client Sample ID: See Below
Sample Date: 09/08/94
Analysis Date: 09/15/94

Client Sample ID	Lab Sample ID	Lead Analysis mg/Kg
C-1	Q40909601	ND5.1
A-10	Q40909606	42.1
--	Method Blank	ND5.0

IT Corporation/Fort Story
Date: 09/19/94
Job Number: Q409096/099
Client Project ID: 519201

Quanterra Environmental Services

General Chemistry Analysis

Client Sample ID: See below
Sample Date: 09/08/94
Analysis Date: 09/14/94

Client Sample ID	Lab Sample ID	Paint Filter Liquids Test
B-3	Q40909602	Passed, No Free Liquids
A-2	Q40909605	Passed, No Free Liquids
A-11	Q40909614	Passed, No Free Liquids/ Passed, No Free Liquids
A-1	Q40909615	Passed, No Free Liquids

Cooler Receipt Form

Project: ~~WPAFB~~ Fort Story GAP 09/12/94 LIMS No. Q409096, 099

Use other side of this form to note details concerning check-in problems.

A. Preliminary Examination Phase:

Date cooler opened: 09/10/94 C-of-C No.: 482176

By (print) Robert Finlay (sign) Robert Finlay

1. Did cooler come with a shipping slip (air bill, etc.)? ..... Yes No

   If YES, enter carrier name & air bill no. here: Federal Express - 1525622464

2. Were custody seals on outside of cooler? ..... Yes No

   How many & where: 4, 1 each corner

   Seal date: N/A Seal name: N/A

3. Were custody seals unbroken and intact at the date and time of arrival: ..... Yes No
4. Did you screen samples for radioactivity using the Geiger Counter: ..... Yes No
5. Were custody papers sealed in a plastic bag and taped inside of the lid? ..... Yes No
6. Were custody papers filled out properly (ink, signed, etc.)? ..... Yes No
7. Did you sign custody papers in the appropriate place? ..... Yes No
8. Was project identifiable from custody papers? ..... Yes No

   If YES, enter project name at the top of this form. Yes No

9. If required, was enough ice used? ..... Yes No

   Type of ice: Wet Ice

10. Have designated person initial here to acknowledge receipt of cooler: BF Date: 9/10/94

B. Log-in Phase:

Date samples were logged-in: 09/12/94 By (print) Glenn A. Peterson (sign) Glenn A. Peterson

11. Describe type of packing in cooler: Wet Ice, Cardboard Inserts, Styrofoam beans
12. Were all bottles sealed in separate plastic bags? ..... Yes No
13. Did all bottles arrive unbroken & were labels in good condition? ..... Yes No
14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... Yes No
15. Did all bottle labels agree with custody papers? ..... Yes No
16. Were correct containers used for the test indicated? ..... Yes No
17. Were correct preservatives added to samples? ..... Yes No
18. Was a sufficient amount of sample sent for tests indicated? ..... Yes No
19. Were bubbles absent in volatile samples? ..... Yes No

    If NO, list by sample number: Yes No

20. Was the project manager called and status discussed? ..... Yes No

    If yes, give details on the back of this form.

21. Who was called? Tom Mathison By whom? Cobb Smith Date: 9/12/94

    to discuss which sample was for QC

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 482176
Page 1 of 3

Project Name/No. [1] Coal Story / 519201
Sample Team Members [2] Bernarde / Wilson
Profit Center No. [3] 3813
Project Manager [4] Tom Mathuson
Purchase Order No. [6] 519201
Required Report Date [11] Normal

Samples Shipment Date [7] 9/9/94
Lab Destination [8] Quanterra
Lab Contact [9] Carrie Smith
Project Contact/Phone [12] Lou Bernarde
Carrier/Waybill No. [13] Fed Ex 15256022464

Bill to: [5] IT Corp
2790 Mosside Blvd
Monroeville Pa
15146

Report to: [10] Tom Mathuson
IT Corp
2790 Mosside Blvd
Monroeville Pa 15146

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
C-1	soil	9/8/94	amber glass	(1) 250ml	4° ice	TRPH EPA 418.1	OK	
C-1	soil	9/8/94	amber glass	(1) 250ml	4° ice	Total Lead	FOR LAB USE ONLY	
B-3	soil	9/8/94	amber glass	(1) 250ml	4° ice	Paint Filter 9095		
B-3	soil	9/8/94	amber glass	(1) 250ml	4° ice	TCLP Metals 1311/6010		
B-3	soil	9/8/94	amber glass	(2) 60ml	4° ice	BTEX 5030A/8020	FOR LAB USE ONLY	
B-3	soil	9/8/94	amber glass	(2) 60ml	4° ice	VOC 5030A/8240/rt		
B-3	soil	9/8/94	amber glass	(1) 250ml	4° ice	TRPH EPA 418.1		
B-3	soil	9/8/94	amber glass	(1) 60ml	4° ice	TOX 9022		

Special Instructions: [23]

Sample Hazard Identification: [24]
Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☒ Archive ____ (mos.)

Turnaround Time Required: [26]
Normal ☒ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify):

Relinquished by [28] (Signature/Affiliation)	Date/Time	Received by [28] (Signature/Affiliation)	Date/Time
Stephanie Wilson	Date: 9/9/94 Time: 10:30	Bob Finley QES	Date: 9/10/94 Time: 1000
Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 482176
Page 2 of 3

Project Name Fort Story

Project No. 519201

Samples Shipment Date 9/9/94

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
B-2	soil	9/8/94	(2) 60ml	amber glass	4° ice	VOC 5030A/8240A	OK	
~~B-3~~ B-1	soil	9/8/94	(2) 60ml	amber glass	4° ice	VOC 5030A/8240A		
A-2	soil	9/8/94	amber glass	(1) 250ml	4° ice	Paint filter 9095		
A-2	soil	9/8/94	amber glass	(1) 250ml	4° ice	TRPH EPA 418.1		
A-2	soil	9/8/94	amber glass	(1) 250ml	4° ice	TCLP metals 1311/6010		
A-2	soil	9/8/94	amber glass	(2) 60ml	4° ice	VOC 5030A/8240A		
A-2	soil	9/8/94	amber glass	(2) 60ml	4° ice	BTEX 5030A/8020		
A-2	soil	9/8/94	amber glass	(1) 60ml	4° ice	TOX 9022		
A-10	soil	9/8/94	amber glass	(1) 250ml	ice 4°	Total Lead		
A-10	soil	9/8/94	amber glass	(1) 250ml	ice 4°	TRPH EPA 418.1		
A-9	soil	9/8/94	amber glass	(1) 250ml	ice 4°	TCLP metals 1311/6010		
A-8	soil	9/8/94	amber glass	(1) 250ml	ice 4°	TCLP metals 1311/6010		
A-7	soil	9/8/94	amber glass	(1) 250ml	ice 4°	TCLP metals 1311/6010		
A-6	soil	9/8/94	amber glass	(1) 250ml	ice 4°	TCLP metals 1311/6010		
A-5	soil	9/8/94	amber glass	(1) 250ml	ice 4°	TCLP metals 1311/6010		
A-5	soil	9/8/94	amber glass	(2) 60ml	ice 4°	VOC 5030A/8240A		
A-4	soil	9/8/94	amber glass	250ml	ice 4°	TCLP metals 1311/6010		
A-3	soil	9/8/94	amber glass	(2) 60ml	ice 4°	VOC 5030A/8240A		
A-3	soil	9/8/94	amber glass	250ml	ice 4°	TCLP metals 1311/6010		
A-11	soil	9/8/94	amber glass	250ml	ice 4°	TCLP metals 1311/6010		

White: To accompany samples
Yellow: Field copy

*See back of form for special instructions.

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 48-2176

Project Name Fort Sterling

Project No. 519201

Samples Shipment Date 9/9/94

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
A-11	soil	9/8/94	amber glass	250ml	4° ice	Paint Filter 9095	OK	
A-11	soil	9/8/94	amber glass	250ml	4° ice	TRPH EPA 418.1		
A-11	soil	9/8/94	amber glass	(2) 60ml	4° ice	VOC 5030A/8240A		
A-11	soil	9/8/94	amber glass	60ml	4° ice	TOX 9022		
A-11	soil	9/8/94	amber glass	60ml	4° ice	BTEX 5030A/8020		
A-1	soil	9/8/94	amber glass	250ml	4° ice	1311/6010 TCLP Metals / 9095 Paint Filter		
A-1	soil	9/8/94	amber glass	250ml	4° ice	TRPH EPA 418.1		
A-1	soil	9/8/94	amber glass	(2) 60ml	4° ice	BTEX 5030A/8020		
A-1	soil	9/8/94	amber glass	60ml	4° ice	TOX 9022		
A-1	soil	9/8/94	amber glass	(2) 60ml	4° ice	VOC 5030A/8240A		
Triplank	water	9/8/94	amber glass	40ml	4° ice	VOC 5030A/8240A		

White: To accompany samples
Yellow: Field copy

*See back of form for special instructions.

MCA 3/15/91

Quanterra Environmental Services

CERTIFICATE OF ANALYSIS

QUANTERRA ENV SERVICES
5103 OLD WILLIAM PENN HWY.
EXPORT, PENN. 15632
CARRIE GAMBER

Date: 09/19/94

Work Order: B4-09-199 P.O. Number: E94-203

This is the Certificate of Analysis for the following samples:

Client Work ID: FT STORY/ 519029 3I4610
Date Received: 09/13/94
Number of Samples: 6
Sample Type: SOIL

I. Introduction

Samples were labeled as follows:

SAMPLE IDENTIFICATION		LABORATORY #
B-3	Q409096-02	B4-09-199-01
A-2	Q409096-05	B4-09-199-02
A-11	Q409096-14	B4-09-199-03
A-11	MATRIX SPIKE	B4-09-199-04
A-11	MTX SPK DUP	B4-09-199-05
A-1	Q409096-15	B4-09-199-06

Reviewed and Approved:

Jon Bartell
Laboratory Director

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 **3I4610** **Work Order: B4-09-199**

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. Quanterra reserves the right to control report production except in whole.

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

SAMPLE ID: **B-3** **Q409096-02**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
Extractable Organic Halide		ND	200	MG/KG	09/16/94	EPA450_1_D

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **B-3** **Q409096-02**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **09/16/94**
DILUTION FACTOR: **50**
UNITS: **UG/KG**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	100

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

SAMPLE ID: **A-2** **Q409096-05**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
Extractable Organic Halide		ND	200	MG/KG	09/16/94	EPA450_1_D

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 **Work Order: B4-09-199**

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **A-2** **Q409096-05**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **09/16/94**
DILUTION FACTOR: **50**
UNITS: **UG/KG**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	99

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

SAMPLE ID: **A-11** **Q409096-14**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
Extractable Organic Halide		ND	200	MG/KG	09/16/94	EPA450_1_D

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **A-11** **Q409096-14**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **09/16/94**
DILUTION FACTOR: **50**
UNITS: **UG/KG**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	100

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

SAMPLE ID: **A-11** **MATRIX SPIKE**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
Extractable Organic Halide		107		% REC	09/16/94	EPA450_1_D

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **A-11** **MATRIX SPIKE**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **09/16/94**
DILUTION FACTOR: **50**
UNITS: **% REC**

	Result	Reporting Limit
Benzene	102	
Ethylbenzene	101	
Toluene	101	
Xylenes (total)	101	
Total BTEX concentration:	405	% REC

Surrogates	% Recovery
4-Bromofluorobenzene	99

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

SAMPLE ID: **A-11** **MTX SPK DUP**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
Extractable Organic Halide		103		% REC	09/16/94	EPA450_1_D

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **A-11** **MTX SPK DUP**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **09/16/94**
DILUTION FACTOR: **50**
UNITS: **% REC**

	Result	Reporting Limit
Benzene	99	
Ethylbenzene	100	
Toluene	101	
Xylenes (total)	100	
Total BTEX concentration:	400	% REC

Surrogates	% Recovery
4-Bromofluorobenzene	99

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

SAMPLE ID: **A-1** **Q409096-15**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
Extractable Organic Halide		ND	200	MG/KG	09/16/94	EPA450_1_D

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 Work Order: B4-09-199

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **A-1** **Q409096-15**
SAMPLE DATE: **09/08/94**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **09/16/94**
DILUTION FACTOR: **50**
UNITS: **UG/KG**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	99

Quanterra Environmental Services

Company: QUANTERRA ENV SERVICES
Date: 09/19/94
Client Work ID: FT STORY/ 519029 3I4610 **Work Order: B4-09-199**

IV. Methodology

Requested analyses were performed according to the following methods.

TEST NAME **BTEX - Purge and Trap** TEST CODE **BTEX**

BTEX	Method 8020, SW-846, Test Methods for Evaluating Solid Wastes, Third Edition. This technique uses a purge and trap with gas chromatography (GC) and photo ionization detection (PID) with a five point curve. This method exceeds the requirement of Method 602. Prep method is 5030.

TEST NAME **Extractable Organic Halide** TEST CODE **EOX**

Extractable Organic Halides	Method 450_1 Appendix D, Method for Extractable Organic Halides in Solids. Used for determination of extractable organic halides (EOX) as Cl- in solids. EOX is defined as the sum of those organic halides which are extracted and detected by pyrolysis/ microcolulometry.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

R409199

Reference Document No. [illegible]
Page 1 of 1

Project Name/No. [1] Fort Story / 519029
Sample Team Members [2]
Profit Center No. [3] 4610
Project Manager [4] Carrie Gamber
Purchase Order No. [6] E94-203
Required Report Date [11] 9/19/94

Samples Shipment Date [7]
Lab Destination [8] AUSTIN
Lab Contact [9] Chris Adkypoff
Project Contact/Phone [12] CLSGamber / (412) 931-8800
Carrier/Waybill No. [13] Federal Express 242 3820 253

Bill to: [5] QES
5403 Old William Penn Highway
Export, PA. 15632
Attention: Carrie Smith-Gamber
Report to: [10] See Above

ONE CONTAINER PER [redacted]

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
B-3	Q409096-02 / Soil	09/08/94	Amber Glass	180 ml.	None	TOX + BTEX	Good [illegible]	3x60
A-2	-05			180 ml.			FOR LAB USE ONLY	
A-11 (MS/MSD)	-14			120 ml.				2x60
A-1	-15			180 ml.				3x60
							FOR LAB USE ONLY	
							GAP 09/12/94	

Special Instructions: [23] analyze MS/MSD on sample A-11 - 1 week Rush

Possible Hazard Identification: [24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☐ Archive (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by [28] (Signature/Affiliation) [illegible] / Quantera	Date: 09/12/94 Time: 1700	1. Received by [28] (Signature/Affiliation) [illegible] QF	Date: 9-13-94 Time: 0925
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29] please fill out & return w/ CoA USACOE cooler receipt form.

MCA 3/15/91

*See back of form for special instructions.

White: to accompany samples
Yellow: Field copy

ITAS Austin QC Batch Summary for AA / Wet Chemical Analysis (Page 1 of 2)

Batch QC ID

Test Code: EOX

Preprep Method	
Prep Method	450.1 - D
Analysis Method	450.1 - D
Batch Date	9/16/99
Instrument ID	A1
Batch (set) #	1

Batch QC Information

Data Reported to : MDL PQL (circle one)

Analyst:	RW
Matrix:	Soil
Units:	mg/kg

QC Sample	Lab ID	Dil. Factor	Date Analyzed	Time Analyzed
Method Blank	9/16/99	1x	9/16/99	1100
LCS	1000 ppm LCS	↓	↓	1200
LCSD	1000 ppm LCS	↓	↓	1600
MS	B409199-01B	↓	↓	1500
MSD	B409199 06B	↓	↓	1530
Replicate	B409199-03B	↓	↓	1545

Sample Numbers Associate With Batch

#	Lab Sample ID
1	B409199-01B
2	02B
3	03B
4	04B
5	05B
6	06B
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	RW
17	9/16/99
18	
19	
20	

General Comments for Batch Export

ITAS Austin QC Batch Summary for AA / Wet Chemical Analysis (Page 2 of 2)

Analyte	Blank Data		Laboratory Control Samples												Replicate Sample Data				
			Accuracy									Precision							
	Method Blank Result	Reporting Limit	LCS True Value	LCS Conc. Found	LCS % Rec	Q	LCSD Conc. Found	LCSD % Rec	Q	Upper Control Limit	Lower Control Limit	% RPD for LCS/LCSD % Rec.	Q	Original Result for Replicate	Replicate Result	REP % RPD	Q	% RPD Control Limit
Extractable Halides	ND	200	1000	1030	103		956.5	95.6		120	80	7.4		ND	ND	0		20

Analyte	MS/MSD Batch QC Data															
	Accuracy											Precision				
	Unspiked Sample Result	MS Result	Spike Added	MS % Rec.	Q	MSD Result	MSD % Rec.	Q	Upper Control Limit	Lower Control Limit	% RPD for MS/MSD % Rec.	Q	MS/MSD % RPD as Reps	Q	% RPD Control Limit
Extractable Halides	ND (59.8)	1130	1000	107		1090	103		125	75	3.81		9.0		20

Qualifiers (Q):

H - Sample concentration was greater than five times the spike level.

N - Spike recovery was outside method control limits.

R - Percent RPD for MS/MSD or LCS/LCSD was outside control limits

* - Replicate % RPD was outside control limits.

D - Sample concentration was greater than five times the spike level.
The RPD was calculated between the MS and MSD results as replicates.

Comments

ITAS QC Batch Summary

QC Batch ID	0
Preprep Method:	NA
Prep Method:	NA
Analysis Method:	BTEX
Batch Date:	" 9-16-94
Instrument ID:	I
Batch (set) #:	1
Test Code:	

Batch QC Information

Matrix: H_2O Analyst: drh

Units: ug/L

QC Sample	Lab ID	Dil Factor	Date	Time
Method Blank ID:	Lab Blank	1x	9/16/94	09:54
LCS ID:	LCS LM10072	↓	"	10:32
LCSD ID:	LCSD LM10072	↓	"	23:17
MS Sample ID:	B409199-04	50x	"	20:53
MSD Sample ID:	B409199-05	↓	" ↓	21:21
Rep Sample ID:			"	

Sample Numbers Associated With Batch:

#	Lab Sample ID
1	B409240-01
2	B409222-01
3	-02
4	-03
5	B409199-01
6	-02
7	-03
8	-04 MS of -03
9	-05 MSD of -03
10	-06
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Data reported to: PQL

General Comments for Batch

Method 80

ITAS QC Bat umary

Page ?

Analyte	Accuracy													Precision				
	Blank Data		Laboratory Control Samples											Replicate Sample Data				
	Method Blank Result mg/L	Reporting Limit mg/L	LCS True Value mg/L	LCS Conc. Found mg/L	LCS % Rec.	Q	LCSD Conc. Found mg/L	LCSD % Rec.	Q	Lower Cntrl. Limit	Upper Cntrl. Limit	%RPD for LCS/ LCSD % Rec.	Q	Original Result for Replicate mg/L	Replicate Result mg/L	Rep. %RPD	Q	% RPD Cntrl. Limit
Benzene	ND	1.00	19.50	18.79	96		19.00	97		80	120	1						30.0
Toluene	ND	1.00	56.80	56.50	99		56.51	99		80	120	0						30.0
Ethylbenzene	ND	1.00	20.40	21.33	105		20.82	102		80	120	1						30.0
Total Xylenes	ND	1.00	122.20	121.98	100		121.14	99		80	120	0						30.0
Surrogates (Percent Recovery)																		
Fluorobenzene										70	130							
4-Bromofluorobenzene	99	100	100	100	100		100	100		70	130	0						

Comments:

Qualifiers/Q:

* - Replicate % RPD was outside control limits

N - LCS recovery was outside method control limits

R - Percent RPD for LCS/LCSD recoveries was outside control limits

Analyte:	Accuracy										Precision			
	Matrix Spike/Matrix Spike Dup Batch QC Data													
	Unspiked Sample Result mg/L	MS Result mg/L	Spike Added	MS % Rec	Q	MSD Result mg/L	MSD % Rec	Q	Lower Cntrl. Limit	Upper Cntrl. Limit	%RPD for MS/MSD	%RPD for MS/MSD As Repo.	Q	% RPD Control Limit
Benzene	ND	993.33	975	102		969.61	99		80	120		1		30.0
Toluene	ND	2864.90	2840	101		2852.35	100		80	120		0		30.0
Ethylbenzene	ND	1029.90	1020	101		1025.17	101		80	120		0		30.0
Total Xylenes	ND	6145.16	6110	101		6123.14	100		80	120		0		30.0
Surrogates (Percent Recovery)														
Fluorobenzene									70	130				
4-Bromofluorobenzene	100	99		99		99	99		70	130		0		

Comments:

Qualifiers(Q):

H - Sample Concentration was greater than five times the spike level

N - Spike recovery was outside method control limits

R - Percent RPD for LCS/LCSD recoveries was outside control limits

D - Sample concentration was greater than five times the spike level.
The RPD was calculated between the MS and MSD Results as replicates.

Cooler Receipt Form

Project: Ft. Story LIMS No. B409199

Use other side of this form to note details concerning check-in problems.

A. Preliminary Examination Phase:

Date cooler opened: 9-13-94 C-of-C No.: 482351

By (print) Lorri Church (sign) Lorri Church

1. Did cooler come with a shipping slip (air bill, etc.)? ..... (Yes) No
   If YES, enter carrier name & air bill no. here: Fed Ex 2423820253
2. Were custody seals on outside of cooler? ..... (Yes) No
   How many & where: 1 Top Right
   Seal date: - Seal name: -
3. Were custody seals unbroken and intact at the date and time of arrival: ..... (Yes) No
4. Did you screen samples for radioactivity using the Geiger Counter: ..... Yes (No)
5. Were custody papers sealed in a plastic bag and taped inside of the lid? ..... (Yes) No
6. Were custody papers filled out properly (ink, signed, etc.)? ..... (Yes) No
7. Did you sign custody papers in the appropriate place? ..... (Yes) No
8. Was project identifiable from custody papers? ..... (Yes) No
   If YES, enter project name at the top of this form.
9. If required, was enough ice used? ..... (Yes) No
   Type of ice: Blue
10. Have designated person initial here to acknowledge receipt of cooler: LLC Date: 9-13-94

Fort Story

B. Log-in Phase:

Date samples were logged-in: 9/15/94 By (print) CHRIS SCHERCOFF (sign) [signature]

11. Describe type of packing in cooler: Bubble wrap
12. Were all bottles sealed in separate plastic bags? ..... (Yes) No
13. Did all bottles arrive unbroken & were labels in good condition? ..... (Yes) No
14. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (Yes) No
15. Did all bottle labels agree with custody papers? ..... (Yes) No
16. Were correct containers used for the test indicated? ..... (Yes) No
17. Were correct preservatives added to samples? ..... (Yes) No
18. Was a sufficient amount of sample sent for tests indicated? ..... (Yes) No
19. Were bubbles absent in volatile samples? ..... N/A Yes No
    If NO, list by sample number:
20. Was the project manager called and status discussed? ..... Yes No
    If yes, give details on the back of this form.
21. Who was called? _____ By whom? _____ Date: _____